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General Scientific

REVIEW OF THE NEUROLOGICAL LITERATURE FOR THE YEAR OF 1912.

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In searching through the vast amount of neurological literature of the past year one is forced to conclude that the resurrectionist has been much more active than has the accoucheur, with the result that while a few new ideas have been brought forth, a multitude of old ideas have been resurrected and clothed in new garments. It is not necessary that an article should contain even one new idea in order that it be read with interest and profit. The personal experiences and observations of any physician are of instructive interest to his fellows. In this review I shall not attempt to discuss the literature pertaining to the entire field of neurology, but shall consider only a part of that relating to a few subjects.

Functional Nervous Disorders:

A review of the literature concerning the so-called functional nervous disorders (and I use the term functional advisedly, as I am of the opinion that all of the disorders so designated have an organic basis), impresses me with the idea that there is no condition in medicine about which there is such a diversity of opinion as to the classification, diagnosis, etiology and treatment as pertain to these disorders. As a class they present such an admixture of psychical and physical symptoms as to thoroughly bewilder and puzzle the wits of most physicians. No terms have been applied more indiscriminately and less scientifically than have been the terms Hysteria and Neurasthenia. Those nervous states which were not understood were designated hysteria, while all types and degrees of fatigue and exhaustion of the nerve elements were called neurasthenia. The literature of 1912 has really added nothing to our knowledge of hysteria. The diagnosis is not so frequently made as formerly. There is a more general recognition of the fact that true hysteria is not a condition of great frequency. Our knowledge and ideas of neurasthenia are being revolutionized. We are learning that there is a difference betwen a neurasthenic state and a neurasthenia. It is not unusual now, but perhaps less so than in the past that manic depressive states are diagnosed as neurasthenia. The irritable weakness which so frequently accompanies hyperthyroidism could be classified as a neurasthenic state but not as neurasthenia. In the early stage of paresis, the patient commonly manifests neurasthenic symptoms, but neither should this be diagnosed as a neurasthenia.

Recently another group has been established into which we are transferring many from the neurasthenic group. We have christened this group the psychasthenics and have definitely established it as a distinct clinical entity.

One of the best articles of the year upon this subject is that by Drs. Alfred T. Schofield and R. Murray Leslie as presented to the Neurological Section of the British Medical Association and published in the *British Medical Journal* of Nov. 23d. I quote literally from this article as follows:

"Before speaking of the necessity of distinguishing a certain well marked class of these cases as psychasthenic one may point out the distinction between neurasthenia and hysteria. We regard the former as principally of physical origin (and especially when we have taken away all the psychasthenic cases) and essentially a neurosis and the latter psychic or a psychosis. It is, however, quite true that the symptoms of hysteria are more distinctly physical than in neurasthenia, though the origin of the former is an aberration or disorder of the unconscious (or subconscious) mind, while the latter is fatigue of the higher nerve centers. Neuromomesis, the most marked feature in hysteria, is not found in neurasthenics. Having then, already one well marked psychic nerve disease in hysteria and a physical functional nerve disease in neurasthenia, it may well be asked: Is there any necessity for a further classification of psychasthenia?

"Janet first proposed 'Psychasthenia for a large class of cases hitherto called neurasthenic. One may arrive

best, perhaps, at what is meant by "psychasthenic" by differentiating it from neurasthenia and hysteria. Psychasthenia is mental weakness and is related to hysteria, feeble-mindedness and other psychoses. Neurasthenia is weakness of the nerve centres and is akin to cardiasthenia, myasthenia, etc. Psychasthenia is seldom solely due to exhaustion or nerve strain. Neurasthenia always is. Neurasthenia is generally acquired and seldom inherited. The term "neurasthenia" is so obviously incorrect in psychasthenic cases that the new term is a necessity.'

"Between psychasthenia and hysteria the difference is as follows: In psychasthenia the seat of the malady is in the conscious mind, in hysteria the unconscious. The bearing of this may not be obvious to those unused to these terms, but it means that in the former the patient is cognizant of the weakness, while in the latter he is not.

"In psychasthenia as a result there is no neuromomesis; in hysteria it is constant.

"Psychasthenia is distinguished by being often (Dubois says always) hereditary, and, therefore more difficult to cure than neurasthenia. There is frequently a family history of some mental disturbance or neurosis. There is often a congenital cause, such as alcoholic poisoning of the germ plasm.

"Psychasthenia may, however, be acquired by unhealthy autosuggestion or by prolonged masturbation (Courtney) or by profound shock. Courtney however goes so far as to say that not less than 75 per cent. are hereditary. Its characters and symptoms are obsessions, a sense of unreality of things, delusions, phobias, loss of will power and concentration, doubts, anxieties, ideas of sacrilege, manias of cleanliness, order, precision, compensation, expiation and every variety of morbid conscience. Phobias may be of movements, objects, places or ideas.

"The symptoms of psychasthenia are mainly mental, though there may be some physical signs; for instance, psychasthenia may lead to paraplegia. Such paraplegia is not classed as hysterical; there may be none of the signs of hysteria present. We may say in passing that we think we have had examples of all of the symptoms we have enumerated and have now under our care a marked case of psychasthenic paraplegia.

"Prof. Janet describes six varieties of psychasthenics: The doubter, the scrupulous, the criminal (homicide, theft, etc.), the inebriate, the sexual and the excitable. The treatment of psychasthenia is difficult and tedious and seldom gives those rapid and brilliant results that one finds in ordinary neurasthenia.

"Hypnosis, which is now, according to Bernheim, Milne, Bramwell, and others, reduced to mere suggestion, is of considerable use, and claims a large success. Our experience, however, has not been altogether favorable in these cases. In all cases rest is essential (sleep, relaxation, cessation from work), suitable environment, freedom from worry, isolation if necessary, and above all, adequate nourishment of the fatigued brain cells by sufficient pabulum. If there is a general mal-nutrition of the body, this must be corrected and modified, Weir Mitchell treatment should be administered as in the case of an ordinary neurasthenic, while one or other of the suggestive methods of treatment may be utilized as an auxiliary. At all costs the vicious circle that has been established must be broken."

In addition to the above suggested treatment of the psychoneuroses I wish to refer to a most excellent article by Dr. H. Crichton Miller which appears in the *British Medical Journal*, of Nov. 23d, under the title, "Re-education of the Attentive Control.". He says the object of the paper is to emphasize the psychic factor which is responsible for the undue inflation of the subjective value of our sensory experience, and to point out the necessity for treating it and to indicate some suitable methods. These propositions are submitted:

(1) That attentive control is the one aim of all true education.

(2) That our educational system is attaining this object less successfully now than previously; and

(3) That when failure of attentive control manifests itself in later life as ill health it falls to the physician to correct it.

After discussing the various theories of many psychologists relative to attention he concludes as follows:

(1) From the physiological standpoint the process is a sensorimotor one.

(2) From the physiological standpoint it involves the facilitation of one idea with a corresponding inhibition of others.

(3) The limen of intensity is distinct from the limen of clearness.

(4) In practice we may regard attention and will as equivalents. The methods of re-education as advanced by Dr. Miller include bodily relaxation, rhythmic breathing—and the following:

(1) Pointing with outstretched arm or leg at a suitably placed mark.

(2) Balancing is a very similar exercise. A stick balanced on the finger is the form usually adopted, but balancing a suitable object on the head is an even better form.

(3) Letter games (word-making) are fairly interesting, and if the element of speed is always present they are extremely useful.

(4) Reading a book upside down is useful, as it is an exercise in which the patient's improvement can easily be gauged.

(5) Writing with two hands is very useful, and the improvement acquired after a fortnight's daily practice will encourage the patient.

(6) Recognizing words spelled backwards is an exercise which baffles a great many patients.

(7) Writing or drawing with the eyes fixed on a looking glass in which the paper is reflected is much the same as in No. 5.

(8) Describing accurately an object or picture which has been examined for a limited space of time introduces the element of memory, but it is most valuable for developing the powers of observation.

(9) Detailing a number of articles, say ten to twenty, exposed for a short time, is much the same as the foregoing exercise, but observation counts for less and memory for more.

(10) Counting with the eyes fixed on a given spot. This is an exceedingly difficult exercise, and perhaps one of the most illusory.

(11) Following with a pin the second hand of a watch is a particularly good exercise.

(12) Finally I would recommend as, perhaps the best all round exercise, the striking out of a given vowel from a column of the newspaper. Munsterberg, McDougall, and others consider this of great value.

Neurologically speaking, the most notable occurrence in America during the year 1912 was the International Extension Course in Nervous and Mental Diseases given at Fordham University, New York, in September. In addition to the lectures given by several New York men and men from adjacent cities, lectures were delivered by Drs. Henry Head and Gordon Holmes of Lon-

dion, Cary Yung of Zurich, A. Knauer of Munich, N. Achucarro of Madrid and Colin Russell of Montreal.

The delivery of these lectures by Dr. Head was so masterly, and his clinical demonstrations were of such a superior character, that we hail him as the greatest living clinical neurologist. In the investigation of the various components of sensation and their abnormalties, he gave the following schedule as the one which he uses:

SCHEDULE FOR THE EXAMINATION OF SENSIBILITY.

(A) Spontaneous Sensations.
Pain, numbness, tingling.
Position of the limb. Idea of the limb.

(B) Loss of Sensation.

(1) Touch
(a) Light touch.
Cotton-wool on hairless and hair-clad parts.
Threshold with Von Freys' hairs.
(b) Pressure touch.
Threshold with pressure aesthesiometer.

(2) Localization.
Naming the part touched.
Henri's method, as modified by Head & Holmes.

(3) Roughness.
Threshold with Graham-Brown's aesthesiometer.
Sand-paper tests: discrimination of relative roughness.

(4) Tickling and scraping.
Tickling on soles and palms.
Cotton-wool rubbed over hair-clad parts.
Light scraping with finger nails.

(5) Vibration.
Loss or diminution of sensibility.
Alteration in the character of the sensation evoked.

(6) Compasses.
Points simultaneously applied.
Points successively applied.

(7) Pain.
(a) Superficial pain.
Pin-prick.
Threshold with the algesimeter.
Reaction to measured painful stimuli.
(b) Pressure pain.
Threshold with algometer.
Reaction to painful pressure.

(8) Temperature.
Thresholds for heat and cold.
Effect on adaptation on the threshold.
Discrimination of different degrees of heat and cold.
Affective reactions (a) to extreme degrees.
(b) to warmth.

(9) Position.
By imitating with the sound limb the position of the affected limb.
By pointing with the sound limb.
Measurement of the defect by Horsley's method.

(10) Passive movement.
Appreciation of movement.
Recognition of the direction of movement.
Measurement of the angle of the smallest movement which can be appreciated.
Falling away of the unsupported limb when the eyes are closed.

(11) Active movement.
Imitation of movement by the sound limb.
Ability to touch a known spot.
Measurement of the defect by Horsley method, as modified by Head and Holmes.

(12) Weight.
(a) With hand supported.
Recognition of differences in weights applied successively to one hand.
Appreciation of increase or decrease of weight.
Comparison of two weights placed one in each hand.
(b) With hands unsupported.
Comparison of two weights placed one in each hand.
Recognition of differences in weights applied successively to one hand.

(13) Size.
Difference—threshold.
Distinction of the head from the point of pin.

(14) Shape. (Two dimensional).

(15) Form. (Three dimensional).
Recognition of common objects by their form.

(16) Texture.

(17) Dominoes.
Ability to count points by touch.

(18) Consistence.

(19) Testicular Sensibility,
Light pressure.
Painful pressure.

(20) Sensibility of the Glans Penis to measured prick.

Dr. Head demonstrated clinically the effect upon the various components of sensation of lesions at the several levels of the nervous system. He began with lesions of the peripheral nerves. His investigations embraced deep sensibility due to the afferent fibers which run with the nerves of muscles and tendons, cutaneous tactile sensibility usually spoken of as light touch and cutaneous sensibility to painful stimulation such as that of a prick. He demonstrated that the extent of the analgesia to prick of the skin produced by divisions of the peripherial nerves bears no constant relation to the loss of cutaneous touch. The more distal the lesion from the center will the extent of the loss of cotton-wool exceed the extent of the loss to prick, but whenever the lesion lies nearer to the central nervous systm these two become more nearly coterminous. If the lesion be of or near the posterior roots the extent of the loss to prick will exceed the extent of the loss to cotton-wool. He also demonstrated that the skin may be entirely anesthetic and yet through the deep nerves of the tendons and muscles the patient appreciates pressure touch. He also demonstrated some of the phenomena which accompany the recovery of sensation after injury to peripherial nerves. He states roughly speaking that about one hundred days are required after severing of tendons and nerves for deep sensibility to be restored. About this time the patient begins appreciating touch and passive movements, but the skin is insensitive to cotton-wool and to prick. He suggests that the surgeon wait another forty days and if the skin continues to be insensitive to cotton-wool and prick the evidence is convincing that while the tendons may have been united after injury the nerve has not been. When the nerve is really divided by the injury the patient appreciates prick much earlier than cotton-wool stimulation. Prick may be appreciated in one hundred days after the injury, whereas cotton-wool is not appreciated when the skin is shaved until approximately five hundred days after the nerve is sutured. When the nerve is not divided by the injury but has lost its functional continuity the reappearance of cotton-wool and prick sensibility are approximately contemporaneous.

Relative to the sensory changes associated with lesions of the spinal cord, Dr. Head makes the following general statement:

"The loss of sensation reveals an arrangement of afferent impulses more consonant with our preconceived ideas. If the patient is insensitive to pain he can appreciate neither the pain of a prick nor that evoked by excessive pressure. In the same way he may have lost all sensation to heat, although he can recognize perfectly all degrees of cold; or heat may be appreciated in spite of complete insensibility to cold.

"All those impulses which underlie our appreciation of posture, passive movement, vibration, the compass-test, size, shape and form become gathered together, so that they can be interrupted apart from those which underlie any other form of sensation. Appreciation of the compass-test may even be grossly defective, although sensations of touch, pain, and temperature are perfectly preserved.

"This remarkable change in grouping of sensory impulses occurs at the first synoptic junction in the spinal cord, where the afferent impulses from the periphery become arranged more nearly acccording to the quality of the sensations they ultimately evoke. Thus a lesion of the spinal cord evokes sensory disturbances which differ fundamentally from those produced by affections of the peripheral nervous system, even by injuries of the posterior roots."

In lesions of the brain stem the tract symptoms are complicated by symptoms of involvement of the nuclei of the cranial nerves and the influence of the lesion upon adjacent structures. Dr Head divided the brain into four levels in accordance with the following table:

SIGNS AND SYMPTOMS.

Cranial nerve nuclei	Same side	Opposite side.	Anatomical cause of signs and symptoms.
(3)	Opthalmoplegia	Loss of sensation to pain, heat and cold over body and face or postural loss; tremor; pyramidal affection.	Spino-thalamic tract, fillet, rubro spinal tract; pyramid.
(5)	Root symptoms of V. Loss of sensation on face of root type, nuclear signs of VI; tremor; cerebellar symptoms.	Loss of sensation to pain, heat and cold over body only or postural loss; pyramidal affection.	Interference with root of V and nucleus VI; rubro-spinal tract which has now crossed; spino-thalamic fillet, pyramid.
(8 and 9)	Cerebral symptoms and giddiness; analgesia of face; paralysis of same half of palate.	Loss of sensation to pain, heat and cold over body only; postural loss.	Interference with nucleus of IX, vestibular nucleus of VIII & Deiter's nucleus descending root of V; corpus restiform, spino-thalamic, outerportion of fillet.
(12)	Analgesia of face; postural loss with possible disturbance of compass-test and recognition of size and shape; cerebellar symptoms.	Loss of sensation to pain, heat and cold over body only.	Descending root of V; fibres from posterior column nuclei which have not yet crossed; corpus restiform; spino-thalamic.

PLANNING THE OPERATING DEPARTMENT.

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I do not propose to tell what a model operating room or department should be. We have had "models" presented to us time and again, but we know that they are not for us. Other people may build hospitals or operating rooms which are models, but our peculiar conditions forbid. We must do what we can, rarely what we should like to do. Dr. S. S. Goldwater says, "The planning of a real hospital is a concrete and conditioned problem, while the designing of a 'model' ward is an abstract or unconditioned one. Some of the older hospitals represent the understanding of engineers rather than the experience of medical administrators and trained nurses." We agree, because each of us knows that his situation is peculiar, that his problem is unlike that of anyone else, that his conditions are far from ideal.

There are, however, certain fundamental principles in the planning of an operating room which cannot be disregarded if one is to achieve any sort of success, and which can always be carried out in one form or another, if we set ourselves and our architects to the task.

Proper isolation from other departments, *good lighting, correct size and shape* of room, and *convenient arrangement* should be insisted upon and are always attainable to a sufficient degree. They are the essentials.

May we utter a warning against fads and fancies? It may be permissible in technique, in materials, or even in equipment, to adopt novelties, things which appeal to us but which have not been thoroughly tried out. In building, the risk is too great, since for the majority of hospitals an operating room is a permanent improvement rather than the following out of a passing fashion. Let the principle of action be therefore to hold fast to essentials, stopping there.

Isolation from other departments is secured in various ways. A separate building reached by an enclosed corridor is doubtless the best, where practicable. An entire wing is second best. The end portion of one floor of a building is the third, and there should be no other. Only the most skilful planning can make the corner of a building acceptable for operating use, and when one attempts to use the center, there are many marked objections.

The importance of correct *lighting* needs no discussion. We all acknowledge the need of a diffused, steady light, without sun and without shadows. A north exposure on the top floor should therefore be secured if possible. One large window, extending into a skylight, is regarded as the best. More than one window is unnecessary, and if put in should be provided with a solid shutter so that the light from it may be entirely shut out if desired. A central skylight with windows at the sides will answer, but is apt to produce annoying crosslights or reflections, and is not a saving

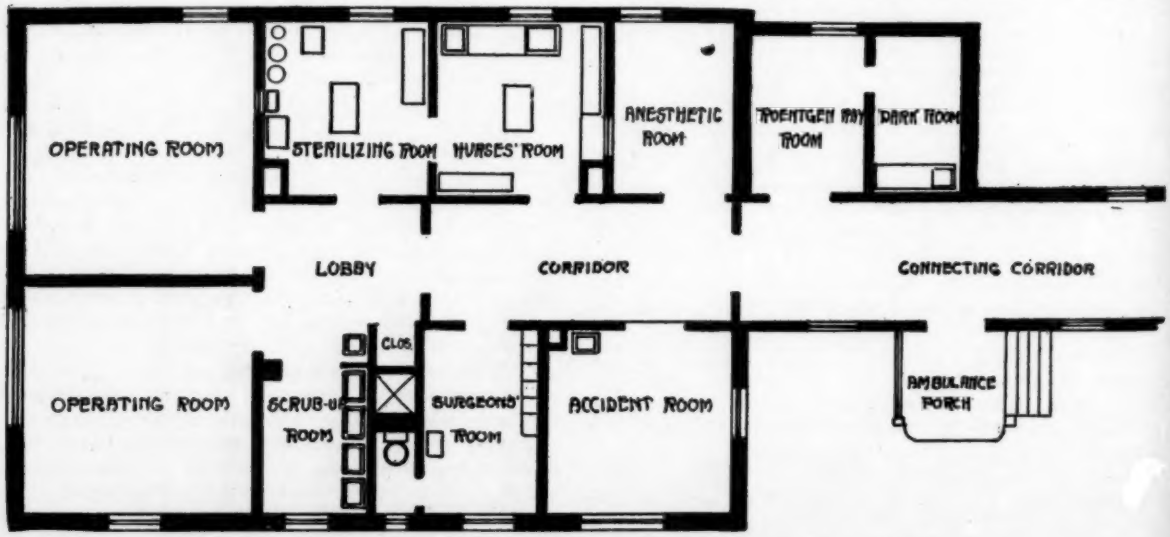

Fig. 1.—FLOOR PLAN QUINCY CITY HOSPITAL. Edward F Stevens, Architect.

in expense. If a skylight is impossible, make the windows of generous size, six, eight, or ten feet in width and as high as the construction of the room will permit. The sill may be 36 or 42 inches from the floor. These wide windows may have a large sheet of glass for the center, fixed, and side lights which swing or slide, to permit airing out when there are no operations in progress.

If a north light cannot be secured, try for a westerly outlook, thus avoiding the sun in the morning, when most operations are done. If for any reason an east or south exposure must be used, a diffused, even light may be had by making the windows of prismatic glass.

If an amphitheatre is to be provided, the *size* should be whatever is needed for the students to be accommodated.

Operating amphitheatres are, however, becoming somewhat *passe*. Men are recognizing the fact that only those in the front really see anything of what is being done; the rest may hear what is said, but learn very little more than they would from a text book. Amphitheatres are useful in medical lectures and clinics, but for actual operative work they are being abandoned.

The *shape* of the ordinary major operating room should be nearly square. A room which is much longer one way than the other is sure to be inconvenient. A room 10 by 18 feet (180 sq. ft.) is bad, while one but 12 by 13 (126 sq. ft.), may be quite satisfactory. There is no advantage in hexagonal or octagonal shapes, and they are more expensive to build than rectangular rooms. Do not, if it can be avoided, have a "jog" or a recess in the wall of an operating room. Four straight walls may be prosaic, but they are the best things here.

The *size* of an operating room is not as important as one at first imagines. A "beautiful large room" has no special virtue in surgery. The additional air space gained is the only advantage and this is a small one. In actual use, the people and furniture are crowded closely about the operating table, and no more space is needed than sufficient to enable the nurses to get about comfortably in doing their work. A room 15 feet square is ample, and in some hospitals less than this will answer.

The *arrangement* of the rooms composing the operating department is all-important. This is where some failures are made when doctors do the planning. It may be hard for the surgeon's dignity, but it is good for his work, if he consults his operating-room nurse in this matter. The surgeon who is operating can judge only what is wrong; he cannot tell why it is wrong. For example, he may wonder why it takes so long to get an extra instrument sterilized, and may blame the nurse or the sterilizer, when the real reason is that she has to go through two doors, down a corridor, and back again to get the instrument, through another door to sterilize it, and through two doors to bring it from the sterilizer; if she burns her hand in opening the sterilizer cover, or drops the instrument from the forceps by which she is carrying it, there is more delay. The larger the operating department, the slower the service. The surgeon, absorbed in his work, is oblivious to the details, but he endures the consequences of them.

Convenient arrangement is possible in nearly every building. It is a question of applying brains to the problem. One should sacrifice almost anything except light in order to secure it. Keep in mind that the instrument- and water-sterilizers and the instrument case are the important items and the problem is much simplified. Other things may be left to the skill of the operating nurse; but the cleverest and most competent woman cannot reduce two doors to one, shorten a corridor, nor take a right angle out of it once it has been built.

In a small hospital, the instrument case, the surgeons' scrubbing sinks, and even the instrument sterilizer may be placed in the operating room itself. Or, the sterilizing room may be at one side of the operating room and open directly from it, while the scrub-up room is at the other side. If there are two operating rooms, it may be of advantage to place the sterilizing room between them.

The plan of the operating building of Quincy City Hospital, Quincy, Mass., given herewith, is an example of convenient arrangement. The two operating rooms, the sterilizing room, and the surgeons' scrub-up room open directly into a small lobby which contains the instrument case. From the main operating room there is a window through which the sterile nurse may reach into the instrument sterilizer, its cover being raised by a hydraulic lift operated by a pedal inside the operating room. (The idea comes from Germany, and was used at Quincy for the first time in this country.) From the second operating room to the sterilizing room is but a step, an since this entire department is shut off from the main corridor, the door into the lobby may be left open; thus if a fresh instrument is wanted, it is but a few steps to the case to get it and a few more steps to sterilize it. If doctor or nurse needs to wash hands during an operation, the scrub-up sinks are equally convenient.

The surgeons' dressing room is next the scrub-up room, but opens into the corridor. The nurses' work room connects with the sterilizing room, so that nurses busy at cleaning instruments or making up supplies can at the same time attend to the sterilizing. The accident room opens from the outer corridor and is very near the ambulance entrance; it is at the same time not far from the sterilizing room. A scrub-up sink is provided in this room, and there is a large window with skylight. It may also be used as a septic operating room. The anesthetic room opens also into this outer corridor, so that a patient may not see the preparation in the operating room. An ample and conveniently located supply closet is provided.

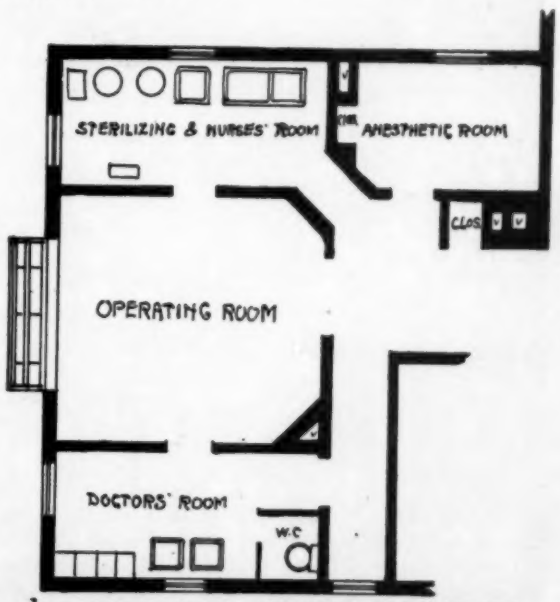

Fig. 2.—Operating department Dr. Williams' Private Hospital, Macon, Ga. Edward F. Stevens, Architect.

Plan No. 2 presents an operating suite suitable for a small hospital. There is the one-light operating room, with sterilizing room at one side and doctor's room at the other. The anesthetic room is very close and a supply closet a few steps away. Any additional rooms required could easily be provided for.

These plans are of buildings in actual use, which have been found to work out satisfactorily.

Details of construction. The best material for an operating room floor is still undecided by the experts. One group advocates small tile, another large tile, another terrazzo, another some sort of cement, and so on. In all of these much depends upon the quality of work and material. If we could avoid all settling and shrinkage in the building, almost any good monolithic material would be satisfactory, providing that it were non-absorbent. Tile, properly laid (i.e., with very small joints well filled with cement) or terrazzo doubtless give the finest appearance, but a good job of granolithic flooring should be entirely satisfactory. When something cheaper must be found, a smooth wood floor covered with plain, heavy "battleship" lineoleum, laid in cement, will give years of excellent service. The one crack which is likely to occur may easily be filled with cement, presenting an absolutely smooth surface. A still more economical floor covering is inlaid lineoleum finished with a good floor varnish. This answers its purpose for temporary use and may wear for several years.

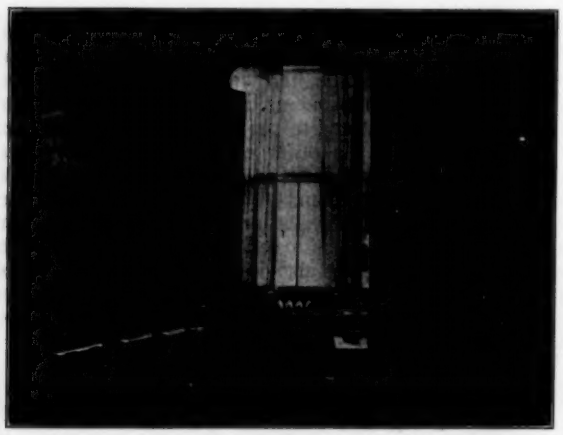

Fig. III. Surgeon's Lavatories and Brown Linen Curtains.

Whatever the floor, there should be a coved base made of one piece with it and finished at its upper edge flush with the plaster, so that there shall be no crack nor projection to gather dust.

The *plumbing* of an operating department is expensive, but if proper fixtures are had and the work well done, they should last for many years with little occasion for repair. The fixtures should be selected with great care and the best fittings and workmanship insisted upon. When once decided, no substitution should be allowed. Many plumbers and some architects do not appreciate the reason for special types of fixtures and are prone to put in something which seems to them just as good.

The one point to be considered is that there shall be facilities for obtaining sterile hands. This means clean soap, clean brushes, and running water of a correct temperature. There should be but one faucet which delivers the tempered water, satisfactory arrangement being made for mixing the hot and cold. The outlet of this faucet should be high enough to obviate all need of stooping and to avoid any chance of striking the hand against the side of the lavatory. (Fig. 3.) The stream which it delivers should be large and smoothly flowing; a spray is best, coming from a 3-inch rose. Pedal or elbow-action faucets are more satisfactory than those operated by the knee. The sink or bowl (Fig. 4) into which the scrub-up water flows matters very little, except for esthetic considerations, as it is simply a receptacle for the waste water. Its outlet should be unimpeded except by a strainer.

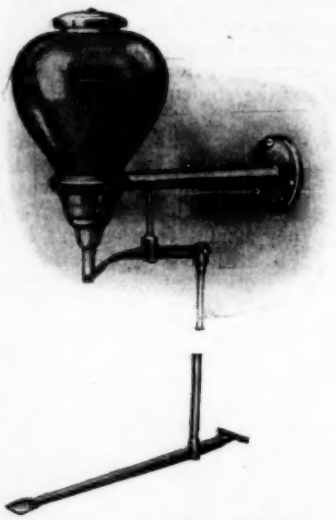

Fig. V. Soap Holder with Pedal.

A proper container for liquid soap (Fig. 5) is essential. An open dish is convenient, but does not afford clean soap after the first portion has been used from it. Any receptacle which must be touched with the hand is utterly wrong. A nurse with a bottle of soap is convenient, but not always available. Some arrangement whereby soap may be delivered by a foot or elbow lever should be provided. There are two on the market which work with a pedal, and one of them at least is quite inexpensive.

Plan all permanent equipment, especially the sterilizers, and the larger pieces of furniture before the building is up, or you may have the expensive and all too common experience of finding that things do not fit or have not been thought of. Many of us know of hospitals where incidents such as the following have occurred. A sterilizing room of ample size was provided and the steam and cold water supply brought into it at a point convenient for the plumber. After the building was finished, the sterilizers were selected and ordered installed. It was then discovered that the steam and water pipes were at a point where it was impossible to locate the sterilizers and that there was no hot water supply and no waste pipe. In order to install the apparatus at all, fireproof floors and walls had to be torn up or large and unsightly pipes run in conspicuous places. In the end about $700 was expended to secure adequate connections, when $100 would have covered it had it been done at the time of building. The exact size and location of each sterilizer should be decided upon by the time the building is framed, and the hot and cold supplies, steam, gas, waste, etc., located and specified.

Sterilizers should be carefully chosen. They are expensive, but if well made should need few repairs for a long time. Do not make the mistake of trying to economize by getting sterilizers too small. It is not a real economy. Consult a good operating-room nurse, follow her advice, and you may take all the credit for the wisdom displayed.

Get a dressing sterilizer which will yield you dry dressings, not moist or wet dressings which must be dried outside before they can be used. If possible, have the water connection made for filling the jacket, using a pitcher, for it is a tedious task. In large hospitals

Fig. IV. Surgeon's Lavatory with Elbow Faucets and Spray.

two dressing sterilizers effect a great saving of time. The fact that one may be filled while the other is being sterilized shortens by a good deal the hours which an operating nurse must work. It also provides absolutely against a breakdown, or loss of time in cleaning and repairs. Many a good sterilizer has been ruined by being used when it was in need of attention, simply because it could not be let out of commission long enough to have it done.

Have amply large water sterilizers. There may be times when to run out of sterile water is a serious matter. Be sure that the nurse who is to be responsible for the use of the sterilizers (also the engineer and the superintendent of the hospital) understand the necessity of cleaning the filter stone often. It is wise to keep an extra filter stone on hand in case of breakage.

Better than filtered water is distilled water. A good water still attached to the sterilizers may be had for $125 up. If a still is used, the water containers may be smaller than otherwise, as if the still be left running the tanks may be filling while one is using from them.

There should be a tank provided for salt solution. This is arranged so that the salt may be put into the container, the solution sterlized and kept at an even temperature (about 120°) ready for use. This costs an additional $50 or thereabouts and avoids entirely the use of the unsatisfactory glass flask.

The utensil sterilizer should be large enough for the utensils for at least two major operations. The cover and tray should be lifted by hydraulic pressure, not by any of the cumbersome mechanical devices.

The instrument sterilizer should be of ample depth and long enough for the largest instruments. It may have a special compartment for gloves. The cover and tray of this should also have a hydraulic lift.

The means of artificial lighting are all-important. The dust-collecting chandelier with a reflector hung low over the operating table has been abandoned. In its place we have a crane light (Fig. 6), which may be swung out of the way when not in use, and be raised or lowered instantly by means of a concealed gear. Its six lights are placed wide apart, so that light streams from every direction upon the field of operation and shadows are avoided. The bell-shaped metal shades afford little lodging-place for dust. If the crane light be not used, four to six electric lamps of 100-candle power may be set close to the ceiling, wide apart. In some of the German hospitals they use a series of reflecting mirrors by means of which light may be thrown at any desired angle. In addition to the central light, there should be a side light, preferably on a stand with an easy universal adjustment.

The actual *furniture* of an operating room should be as scanty as may be. Only articles which are frequently used should be allowed. An operating table of a pattern as simple as is consistent with convenient adjustment, two oblong instrument tables (or one curved table), a basin stand for three basins, an irrigator stand for two solutions, a stool and stand for the anesthetist, a stool for the surgeon, a footstool for use when the patient is in Trendelenberg, a table for unsterile supplies, and perhaps a smaller one for reserve materials, are sufficient. The customary shelf stand is unnecessary and merely catches dust. A stand for the containers of sterile dressings may be added, and an electrical towel heater.

Do not use glass table-tops. Porcelain enamel, which is smooth, acid, alcohol and ether proof and practically indestructible, or the new monel metal, are best. Let the top of the operating table contain as few pieces as possible, be dished to fit the back, and have no complicated adjustments. Let the stools have four legs, not three, and see that they do not project and trip the passers-by. The basin stand should revolve. The irrigator stand should be adjustable to different heights, and should have a basin attached to hold the end of the tubing. If spectators are frequently permitted, a small observation stand should be provided. This need not provide for seating, as one invariably stands while watching an operation.

In the equipment of the rooms adjoining the operating room, follow the same rule of providing only what is absolutely essential. In the surgeon's scrub-up room there should be only the lavatories. In their dressing room, furnish a sufficient number of lockers (preferably of metal with sloping tops), a few chairs and a small table; there should be a mirror. The sterilizing room may have a metal cabinet for storing sterile supplies and a small table. The nurses' work room should have one or more good sized work tables, two or three comfortable chairs or stools, and plenty of cupboards or cases for supplies. If the instruments are cleaned here, a small white enamel sink and a porcelain or opal glass scrubbing slab should be provided. A small wash tray may be added for soaking out stained linen before it is sent to the laundry. In most instances a nurses' dressing room should be provided, even though it be a little more than a closet.

The instrument room should contain the requisite number of cases and one small table. If the surgeons bring their own instruments, it is best to use the Grace

Fig. VI. Crane Light for Operating Room.

Hospital instrument case, giving a locker for each doctor. Each man's instruments are thus kept by himself, and only he and the operating room nurse have the key.

The anestthetic room should contain only a wheeled stretcher, a stool for the anesthetist, a small table and a shelf or case for reserve supplies. The stand for materials used at the giving of an anesthetic may be kept here and wheeled into the operating room along with the patient. If there is an accident room, the equipment is practically that of the operating room.

In any of the rooms where curtains are required—as the surgeons' dressing room, nurses' room, anesthetic room—use linen curtains hung from a rod with a traverse fixture so that they may be pushed apart or drawn together by a movement of the hand. This does away with the unsanitary window shade. In the operating room itself, there should be no curtain of any sort. If necessary to screen direct sunlight from the skylight, it is better to use Florentine or some sort of obscure glass.

Heating. Operating rooms are hard to heat, chiefly because they demand a higher temperature than is needed in the rest of the building, and because the large window expanse presents a great area to the outside air. Much more radiation should be allowed than for an ordinary room, and except in very mild climates, the windows should be double. Do not use a heating system for the operating room which involves a forced draft, as this keeps the dust particles in the air constantly stirred up. At Jefferson Hospital, Philadelphia, there is a considerable space between the two sets of windows and the heat is introduced here. The inner partition is cut short, and the heat allowed to enter at the bottom, thus avoiding the current which would be created were the opening at the top. If radiators must be used in the operating room, bear in mind that the nurse in charge will be certain to cover them, and make them sufficiently large to provide heat despite this.

SAFEGUARDING THE INSTRUMENTS DURING OPERATIONS.

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The story is told that in a certain square in a German city a sentry was kept pacing up and down for more than a hundred years. There was nothing to guard and apparently no reason for the existence of this particular sentry. Upon inquiry it appeared that there used to be a statue in that square which the soldier was supposed to preserve from harm. The statue had for many years been removed, but through a careless omission no order for the discontinuance of the guard had been issued. Therefore a sentry was kept all day and all night pacing up and down in aimless fashion.

In the early eighties when I first saw surgery, the instruments were kept during the operation immersed in a solution of carbolic acid. Disinfection by boiling had not come into vogue and it was necessary to wash and scrub and rinse the instruments with the greatest conscientiousness between operations. The handles of the instruments were perfectly smooth so far as lay in the power of the manufacturer, no crack nor crevice being left. Even the maker's name was put on in raised letters instead of being stamped in as is done now. The pre-antiseptic chain-saw was thought to be a filthy thing and the modern Gigli's wire saw would have been considered quite impossible because it could not be cleaned. Still, by taking great pains and by rigidly enforcing the sequence of clean cases before dirty ones and by judicious drainage and dressing the results in the days of antisepsis and also in the early days of asepsis were excellent. Then we learned to cleanse the instruments by boiling in soda solution and the surgeon heaved a sigh of relief not only because he was rid of one responsibility but because of the saving of time between operations. The troublesome scrubbing of the instruments was ended. The carbolic solution was now relegated to the past and the instruments were permitted to lie dry upon a sterile table. The day of antisepsis was passing and the era of asepsis had arrived.

No longer were our hands to suffer the insults of the dermatitis-provoking phenol. The instrument table was to be kept neat and dry and the pans of carbolic were abolished. But human effort does not yield perfection and the invariable primary healing of so-called clean wounds was still not assured. Rubber gloves then made their appearance as a new safeguard for patients and surgeons alike. And still we had occasional infection where there should have been perfect asepsis.

I became convinced that some of the bacterial contaminations in my wounds were caused by dust and that others were undoubtedly carried by flies, these ubiquitous pests alighting upon the instrument table and crawling over the instruments during the actual progress of the operation. Twice maggots were found in the wound at the first dressing following an operation which was supposed to have been absolutely aseptic. In another case a gas-bacillus phlegmon was ascribed by me to a fly which had alighted upon the wound itself during the operation, and this theory became strengthened when I learned that a patient with this form of infection had been operated upon in this same room, three weeks before.

Now although it is obvious that an effort should be made to banish insects from operating rooms yet some will get in in spite of every precaution, and it is from these that we must shield our instruments and incidentally our patients.

For the past three years I have gone back to the old carbolic immersion and, I believe, with benefit. The instruments are kept submerged in pans which contain a 2 per cent. aqueous solution of carbolic acid. This strength is sufficient to prevent rusting and is not an irritant to the body tissues unless it is carelessly permitted to drip into the wound in large quantities.

One important reason for having discontinued this safeguard in the past, namely, the irritation of the hands due to long-continued contact with the phenol, has now been rendered inoperative by the universal use of rubber gloves; yet as in the case of the sentry mentioned in the beginning of this little paper, I find that although the reason for abolishing the carbolic no longer exists it is difficult to persuade my surgical colleagues to return to what they consider one of the older and discarded methods. But it is by no means true that because something has been rejected in the past its usefulness may not again be recognized.

In my operating rooms the greater part of the armamentarium on the large table is immersed. The few instruments that are in constant use are kept in practically under the surgeon's hand on the little table which extends over the patient. Needles and ligatures are submerged in alcohol. Dressings should be kept covered when not in actual use.

The immersion of the instruments in an antiseptic solution is worth reviving. It will prevent the fly-borne and dust-borne infection of instruments and of ligatures.

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ELECTRICAL INJURIES FROM PUBLIC SERVICE CURRENTS.*

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The present field of industrial electricity presents a different aspect from that of past years. Types of generators, with their supplementary machinery, have changed radically and the details of circuit installation have been modified and improved. Hence the old data are of greater historical interest than present value. Moreover, the literature of electrical injuries is most confusing by reason of its mass of inaccurate and conflicting statements. For example, the terms lightning and electricity are often used interchangeably, although the mere novice appreciates the fact that the former, which is an agent of enormous voltage and slight amperage, is applied under conditions peculiar to itself and produces results seldom manifested in the departments of Public Service. The result is, that the testimony of experts in courts of law reminds one of the seeker after Truth who had met with indifferent success. In the attempt, therefore, to clarify the atmosphere, we venture to offer—not a dissertation on this subject—but rather a summary of facts and opinions deduced from the latest literature.

The indirect causes of most accidents are leakage and overcharge produced by grounds, crosses, poor connections, breaks, and defective insulation, while the results are determined by the nature of the current and such individual factors as body resistance, susceptbility, perfection of contact and path of the agent.

The direct current, with its maximnum of about 500 volts and 300 amperes, now employed chiefly on street railways and for other power purposes, is much less productive of accidents by reason of its safeguards and its limited applications, through which the individual is either fully protected or receives but a fractional portion. When passed through the body, it burns but does not shock unless break of circuit occurs through arc, contact, or other mischance. On the other hand, the alternating current of 60 periods, or 120 reversals per second, as ordinarily found in the transmission wires of electric light and other circuits, possesses elements of danger which are apparent at every turn. With high voltage, more or less defective insulation and close proximity to all kinds of conducting material, it requires but a slight contributing cause to produce a casualty. The ordinary circuit with lights in series has an average voltage of 2500 and amperage of 6 to 10, each lamp representing from 50 to 75 volts. It may be of the single or polyphase variety, though the significance of the phases as regards injury has not yet been determined. It develops likewise a self-induction current, which may exhibit great intensity when the circuit is opened, but less when closed. In either variety, rapid breaks of course increase the dangers to a marked degree. In the case of high tension transmission wires carrying from 10,000 to 60,000 or more volts and reduced by transformers to varying potentials, the dangers are increased to corresponding degrees. For example, broken down insulation between its primary and secondary coils may throw a heavy load upon the house-service system. Complete insulation of the larger feed-wires is not possible and not even attempted outside of city limits. Not only *house service*, but *telephone* and *telegraph* wires may become overcharged by these, and though the amperage in such instances is usually small, the high voltage is often sufficient, in the presence of a good ground, to blow out protecting fuses and either by arc or continuity work havoc along its path.

There are reported in the *Boston Medical and Surgical Journal* two fatal instances of this character. One in which a man was killed in his office while using the telephone—its wire being overloaded by a crossed arc-light feed wire; and another in which a woman met a similar fate from a short circuit between a telephone and the switch of an electric lamp through the medium of her cuffbutton.

Human as well as inanimate conductors exhibit varying degrees of resistance. That of the body is both surface and internal. It is estimated that when a current traverses it under the most favorable conditions, the resistance averages 5000 ohms. Blood transmits this agent readily while bone does not. Skin is one of the poorest conductors. The dry calloused hands of the laborer may withstand a pressure of many thousand ohms, while other portions of the body fail to resist five or six hundred. While high voltage may force a large amount through it, the fact is self-evident that none can enter the body so long as the resistance remains complete. This applies of course to ground resistance as well. If this approximates infinity, the current becomes harmless, but unfortunately wire and cable conduits and the floors of modern factories and workshops are good conductors and enter into the estimate of contributory factors.

The state of the cerebral cortex and the physical condition also are determining causes. A sleeping person reacts less readily than one who is awake, and the same is true of one under the influence of alcohol. Heart disease and other organic lesions lower the resistance. Jellineck cites the case of a laborer who was warned not to touch a certain wire. He did so accidentally and fell dead, although it was afterwards found that no current was passing at the time. A post-mortem disclosed the condition of status lymphaticus with enlarged thymus gland. Although Broca contends that when low-tension currents produce death, some underlying cause must be present, the later conclusions of Howell are that while high-pressure shocks act upon the respiratory centers and produce asphyxia, those of low-tension act directly upon the heart—throwing it into fibrillary contraction.

Extent of injury depends in great measure upon perfection of contact. In most accidents the victim is not completely in circuit and receives but a fractional part of the amount on the wire. Even under better conditions resistance, as we have seen, is not fully overcome. Indeed, the complete degree of conduction is seldom attained, even in fatal cases. Moreover, it is difficult at times to determine as to what structures lay in the path of the current, for we know that the course between the two poles is not a straight line, but the path of the least resistance—however devious that may be. Thus a person may survive a strong current through certain parts of the body, but promptly succumb to a comparatively weak one passing through the brain, spinal cord, or along the pneumogastric nerve.

For these reasons, therefore, it is no easy task to designate currents which are lethal or non-lethal. According to Jellineck, 100 volts are dangerous and 50 unsafe. *"L'Electricien"* considers 50 to 100 milliamperes dangerous to life, while Zacon holds that anything above 500 milliamperes would be very serious, or fatal. It is probable that mild currents, if long continued, will produce fatal results. If voltage is low and contact fairly good, there ensues a tetanic contraction of the muscles and the victim, once attached to the wires, is

* Read at the 121st meeting of the New Hampshire Medical Society.

unable to free himself. Prof. Weber through self-experimentation under the best conditions, found that 30 volts of the alternating variety produced almost a paralysis of the muscles, with severe pain and difficulty in releasing the wires, and that with a voltage of 50 it was impossible let go. He believes that twice this amount, without immediate rescue, would prove fatal and quotes several cases in support of this view. Unfortunately, many of the opinions upon these points are based upon animal experimentation; hence the records are neither applicable nor conclusive, for, as a matter of fact, most animals are readily killed by 100 volts. The reports, moreover, lack uniformity, for in one case amperage, in another voltage is offered as the causative factor.

Cases in which minimum amounts of current have produced death are of special interest in this connection. Tschmarkes reports the case of a man who died of cardiac degeneration eight days after receiving a current of 50 to 119 volts. Jellineck refers to a man who was instantly killed by 100 volts, to another in Austria by 160 volts, and to a third in Germany by 65 volts, while a fourth under good conditions of conduction was killed by 350 volts.

Bergonie has observed one death from 550 volts of a constant current, yet the inference is strong that a milder one might have produced the same result. Von Zualenburg's vase, however, is the most instructive. While under the roof of a building, a workman's head came in contact with an uncovered wire supplying a drop-light on the floor below. The man was standing on a gas-pipe and was perspiring freely. Length of contact was about 30 seconds. There was an outcry, followed by a general convulsion and death. The only objective sign was a small linear burn 2½ inches long near the left mastoid process. The wire was tested and found to be carrying 100 volts with no evidence or suspicion of overcharge. Amperage not known, though probably fractional.

On the other hand, various foreign observers have recorded instances in which currents of 3000, 5000, 6000 and 10,000 volts have been sustained without fatal results. Bergonie reports a case in which contact with a 14,000-volt wire produced only a temporary and partial disability. There is no evidence, however, that these amounts were actually sustained by the individual in any of the above instances.

In one of the earlier electrocutions at Auburn prison, the victim partly recovered consciousness after receiving a voltage of 1260 given presumably under the most favorable conditions. That of 1700 and amperage of 10, however, as now officially employed, has proven invariably and promptly fatal.

In forming a proper estimate of actual conditions in some of these cases, it must be recalled that light and power circuits exhibit varying potentials during the hours of service—these fluctuations being dependent upon the faults or limitations of the system, or the irregular character of the work performed.

Present data, therefore, warrant the following propositions:

(1) In cases of electrical injury the amount of the current actually received by the victim is purely problematical.

(2) Fatalities are dependent upon the direction as well as the intensity of the current.

Attempts to establish a definite pathology have thus far proven unavailing. Numerous post-mortem examinations have failed to disclose any gross or microscopic findings which are characteristic. In the six autopsies of electrocution victims performed by Van Giesen, practically nothing was discovered. Rigor mortis appears early and lasts but a short time. There is usually some spinal effusion, petechial hemorrhages in the floor of the fourth ventricle and elsewhere, and, according to Jellineck, destruction of cells and modifications of nuclei. No doubt many lesons attributed to the current were in reality due to other and antecedent causes, though the secondary degenerative lesions which sometimes follow presuppose same causative factor which may finally be determined. Sudden death, however, may be said to result from the inhibitory effect of the medulla upon the heart and respiration. Cases which have finally succumbed to pneumonia, cardiac degeneration and other internal lesions are unfortunately lacking in the details necessary to formulate a theory, though in cellular destruction and vasomotor impairment may be found plausible and suggestive data.

As the "Railway Spine" of Erichson has materially promoted the gaiety of nations and the ingenuity of the medical expert, so electrical shock makes a similar bid for notoriety by offering the paradoxical proposition that similar causes, acting under like conditions, produces diverse results. As a matter of fact, no actual distinction can yet be made between electric shock and that arising from other sources. In both, the psychic element may enter and either produce derangements or intensify conditions arising from the physical variety. In some instances shock from high voltage is but temporary and accompanied by no sequelae whatever; in others, grave organic lesions appear to have been produced.

The external effects of electricity are usually observed where the current enters and leaves the body, and are directly dependent upon the conditions of conductivity and resistance. They are produced by high voltage, long application and small points of contact. High amperage will produce burns of large area, while a low one will burn if the points of contact be small. Strong currents may pass through the body with little injury to the skin, while those comparatively weak will produce varied and severe effects. Fatal cases have been observed in which the sole evidence of violence was a small and insignificant mark on the head or extremities. Indeed, we must accept the statements of Taylor and others, that electricity may kill and yet leave behind absolutely no evidence of its destructive action. The skin may show merely spots of erythema or punctate and disseminated areas of ecchymosis with linear or indefinite markings, sometimes local oedema and small necrotic but superficial spots. The actual burn has a well-defined margin and little or no redness. The surface is dry and to the touch is like parchment, but blebs may appear after a period of 12 to 18 hours. Owing to the destruction of the terminal nerves the injury is usually painless, and the victim may at first be unaware of its existence. Occasionally there is numbness, tingling or throbbing pain. The lesion is often deeper than first appearances indicate; not rarely a complete carbonization of the tissues beneath the skin forming a dead but aseptic mass surrounded by living tissue. Through a long process of repair this becomes separated and eliminated—often without the intervention of any septic process. Extensive destruction, resulting in gangrene, has a fairly well-defined pathology, while minor degrees furnish less marked evidences of trophic disturbance, lessened tissue resistance, thrombosis and nerve impairment. Under the best conditions repair is slow and halting and taxes severely the strength and patience of the individual.

Electrical injuries of the eye may be produced by heat, ultra violet rays, or electrolysis. They may involve not only the superficial structures, but the lens and various portions of the retina and visual centers. Minute opacities of the cornea and lens—intra and extracapsular, have been frequently noted. Würdemann summarizes these lesions by stating that the electrical current produces thermic effects and if of sufficient severity burns the lids, causes catalytic changes in the albumen of the tissues, and later, changes in the nutrition of the lens, and cataract through impairment of the tonicity of the vessels. However, the various degrees of visual impairment—even complete blindness—may prove in many cases of short duration.

The acute symptoms of electrical injuries are cardiac, respiratory and cerebrospinal, though most cases present a more or less composite picture which does not admit of classification.

The more important of these are:

Pain, headache, vertigo, mental confusion, impairment of special senses, paralysis of extremities or of certain groups of muscles, muscular spasm, convulsions both tonic and clonic, general signs of collapse with shallow or Cheyne-Stokes respiration, coma—more or less complete, with cyanosis, stertor and frothing from the mouth and an elevation of temperature which is often extreme.

In non-fatal cases the patient may make a prompt and complete recovery, the terminal effects being solely those of asthenia. But, inasmuch as any of these symptoms may be produced by concussion, fracture of the base or injury of the spine, a person falling from a height as the result of a shock, may present a diagnostic problem of considerable interest.

The later and more persistent conditions, of which there are many, have been considered in detail by Kratter, and are summarized by Mills and Weissenburg in the following classification:

"(1) Functional nervous affections, as hysteria hystero-chorea, neurasthenia, hystero-epilepsy, hystero-neurasthenia.

"(2) Apoplectiform and epileptiform seizures, with or without persistence of such sequelae as paralysis, anesthesia and diseases of the special senses.

"(3) Rarely bulbar or bulbo-spinal paralysis."

A large proportion of the above being simply traumatic neuroses and differing in no respect from those which follow other accidents, demand no further consideration, but in view of the many reports of various types of insanity following such injuries we may properly consider the latter as causative factors in the production of the graver lesions. Amnesia, both simple and retrograde, is not unusual and rarely may have a pathological basis. Often there is loss of memory of all events following the application of the current, or it may involve occurrences preceding the accident a day or more. There occurs frequently during actual contact a vivid recollection of many past events, both disconnected and in sequence.

Many of the affections of the eye which have been noted as existing as acute manifestations may persist in a chronic form, or others, such as neuritis, retinitis, amblyopia, ocular paralsis, or cataract may supervene after varying periods of time.

In illustration of the local paralysis which may ensue there is recorded the case of a man who, while on a wet plank walk accidentally touched an arc light with his umbrella. The immediate results were an epileptiform convulsion and a monoplegia of the arm, apparently central in origin and of sufficient gravity to secure a substantial verdict against the company. The same authority reports in detail a case of bulbar paralysis produced by a current of 2000 volts. One of Jaffrey's cases sustained a shock of 720 volts. He suffered from mental confusion, but apparently recovered. Three weeks afterwards he was suddenly attacked with visual and auditory disturbances and later became unconscious for 20 minutes. General paralysis with blindness and complete dementia finally ensued.

The above cases are perhaps sufficient in number and diversity to illustrate the many phases of these injuries. It should be remembered, however, that here, as in other traumatic neuroses, when dementia or other degenerative conditions supervene, there is often an underlying basis of alcoholism, syphilis, epilepsy or arteriosclerosis.

Mills comments on the frequent suits against electric light companies, aften brought by employees for injuries sustained in line of duty. Here the issue rests upon trespass, contributory neglect and failure to regard instructions. A lineman, after receiving a shock, may fall from a pole and sustain certain cerebral injuries, the true origin of which it may be difficult or impossible to define. The disability may be considerable and closely simulate an organic lesion. Gordon reports a man hit with a broken trolley wire, who developed loss of power, complete in the left leg and partial in the left arm with anæsthesia of the entire left side. Recovery complete in two months—after a settlement with the company had been effected.

In actions based an injuries from live wires and overcharged conductors, the plaintiff usually recovers whenever such injury arises from displaced or improperly maintained wires or apparatus, even though he may have failed to exercise ordinary care and circumspection. Mills, in his paper, suggests that inasmuch as one who is burned or shocked falls from a height and is injured because of the shock, or suffers immediately or remotely from internal injury or traumatic neurosis, is entitled to damages, provided no contributory negligence is established, it is most important that we should determine, if possible, the exact nature and extent of all such injuries and be able to explain to what extent they are due to electricity. Here the intensity of current is of little importance as compared with its connection with the injury and subsequent disability.

The physician may be asked whether prompt medical attention might have saved the patient. The experience of most investigators is to the effect that here, as in cases of drowning, death is often apparent rather than real, and that the victim may recover after the long continued use of such measures as elevation of the head, venesection, massage of the heart, artificial respiration, puncture of the spinal cord and general stimulation. This is illustrated by a case reported by D'Arsonval, in which recovery followed efforts of resuscitation which were first begun a full half hour after the accident.

Limitations of time preclude the consideration of many of the minor details of the subject and facts readily obtained from the text-books. The topic has been treated chiefly from a medico-legal standpoint, inasmuch as the expert who is lacking in a definite knowledge of electricity, its application and the manner in which it acts is poorly equipped for the work in hand. Many of the claims based upon such injuries are fraudulent—many of the conditions described by the claimant might be readily controverted by one possessing a technical knowledge of the subject. Hence, this paper is offered not only as a slight contribution to our present data, but as an incentive to the more careful study of electrical injuries.

THE TWO MOST FAR-REACHING DISCOVERIES IN MEDICINE.*

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Of all the arts practised by man, the art of medicine is, perhaps, the most ancient. Even before man could conceive ideas and utter his concepts through language, certainly before he could formulate laws and principles of thought and action, he was a prey to offensive environment and, if not a constant, a more than occasional victim of the overwhelming elements of surrounding nature. Helplessness bred wonder, and with ills and aches and hurts came awe and propitiating superstition.

No greater discovery was ever made than that of Hippocrates, the physician of Kos, when he found that diseases and injuries are of natural origin. In Chapter XXII of his work on air, water and places, he declares distinctly that no disease arises without a natural cause; oudén ánev phúsios gínetai. The effect was far-reaching. The discovery that diseases have nothing to do with astronomical or religious or mythical speculations pointed the way to all subsequent discoveries in medicine and the impelling force is not yet entirely spent.

From I-em-Hetep, the first physician of whom we have a definite record, to Hippocrates, there are over four thousand years. From Hippocrates to our own day, there are over two thousand years. In all these six thousand years of medical history, there is but one struggle, the struggle between natural and speculative medicine. In the somewhat fragmentary writings bearing the name of Hippocrates we find the germs of all modern medicine, but the great achievement of Hippocrates does not rest on these. His great achievement was that he, for the first time, found and taught that diseases are of natural and not supernatural origin; that diseases are caused by agencies that can be removed or whose effect can be neutralized; in short, that medicine, like any other natural science, is subject to the natural law of cause and effect. Law governs all things, says Hippocrates, in Chapter I. of his work on the human seed, nómos mén pánta kratúnei a truth that it would be well for most modern physicians even to heed.

"He is great who confers the most benefits," says Emerson, and in the same light we may say that that discovery is great that brings in its trail the most beneficial, the most far-reaching effects. The conception of disease being due to natural causes, the emphatic divorcement of nature which we can observe from supernatural elements on which we can only speculate led to observation and investigation, physical, chemical, biophysical, biochemical, led to the dissection of the human body by Vesalius, to the mechanical interpretations of Borelli and Pitcairn, led to the chemical interpretations of Sylvius and Willis, to the physiological experiments of Harvey, to the pathological anatomy of Morgagni, to Bichat and Broussais, who sought to establish the anatomical basis of diseases, to Auenbrugger and Laennec, who extended the methods of the physical examination of patients, to Johannes Mueller, who laid the foundations for modern physiology, to Virchow, who founded the structure of celluloid pathology, to Pasteur and Koch, who fixed the etiology of infectious diseases. The hippocratic practice of semiotic and prognostic medicine led to observation of clinical phenomena and the observation of clinical phenomena led to their explanation by other larger natural phenomena, to the discovery, as far as it has gone, of their physical and chemical causes, to modern medicine as a veritable science, a complex natural science of anatomy and physiology, of pathology and therapeutics, of life and living, of health and disease, of causes and effects.

Sacerdotal medicine, with its fastings, its washings, its prayers, its sacrifices, its solemn processions within and without the temples erected to divinities, its incubations or sleep at the foot of the god one desired to propitiate, had no proposition for man to solve, for the solution lay in regions which man could not control. But medical art has an end for which it plainly exists, and has propositions which must be defined, and these propositions it turns over to science. This brings us to the next, the second, most far-reaching discovery in medicine.

Hippocrates had brought disease within the category of observable phenomena. He introduced the custom of writing down one's observations as one makes them. This method of taking clinical histories fell into disuse. Medical men became more interested in disputatious methods of procedure. The humoral theory was more attractive than plain observation and deduction. The aim to discover which of the four humors were out of proportion and which was the best method of restoring them to their natural equilibrium created the various schools of medicine, the medical dogmatists, the medical empiricists, the medical methodists, the iatrophysicists, the iatrochemists, the iatrovitalists, just as to-day the various accepted or proffered methods of restoring the natural equilibrium have brought forth mechanical and dynamic schools of thought, have led to comprehensive and unmethodical practices in medicine. There was hardly a disagreement as to the improved theory of the humors of the body. There was disagreement as to the methods employed to restore the natural equilibrium of the improved, theoretical humors. Just so to-day. There is hardly a disagreement as to the speculative features of medicine. There seems to be a contagion resting in speculation. One starts a theory and all are ready to fall into it. But bring out a fact, a method for establishing facts, and there is disagreement, delay, obstruction, the shadow of failure awaiting us. It is so much easier to speculate. It is much harder to work, and the scientific world, like the unscientific world, prefers to go with the current that meets the least resistance.

The second most far-reaching discovery in medicine was made by Hahnemann. Both friends and foes alike have for a hundred years mistaken the real achievement of Hahnemann. Friends hail him as the founder of the homeopathic method, law or principle. Foes oppose him for pathological vagaries and the small dose. Both friends and foes take the unessentials and forget or overlook Hahnemann's essential contribution to medicine. As Hippocrates brought disease action within the category of observable phenomena, so Hahnemann brought drug action within the category of observable phenomena. He discovered that drugs produce in the healthy body series of subjective and objective symptoms, corresponding to entire disease pictures. This discovery was secondary only in time to the great discovery of Hippocrates. The two discoveries are of equal import to the scientific practice of medicine. If we except all the cases in which adjustive medicine, which embraces surgery, mechanics, mental and bodily hygiene, and so-called physical therapeutics, are applicable, there still remains the largest contingent of ills which demands treatment of a constitutional nature.

*Read at the Fourth Annual Meeting of the American Association of Clinical Research, November 9th, 1912.

To treat these ills with any degree of scientific certainty, we must know not merely what we are to treat, but how, and, if possible, also why.

Already Hippocrates, in Chapter XX. of his work on the ancient art of medicine, declared that it is necessary for a physician to possess a knowledge of the natural sciences and to know, if he wishes to fulfill his duty as a physician, how the patient stands in relation to food and drink and other applicable measures, and what effect each of these has: ho ti estin ánthropos prós tá esthiómená te kaí tinómena, kaí ho ti prós tá álla epitedeúmata, kaí ho ti aph' hekástou hekásto sumbésetai. In Chapter I. of his work on the winds, he says that the art of medicine consists in addition and subtraction: retriké gár esti prósthesis kaí aphaíreses, aphaíresis mén tōn huperballónton, prósthesis dé tōn elleipónton: taking away what is excessive and adding what is wanting. This is the method of hygiene, surgery and mechanotherapeutics. In Chapter II, of his sixth book on epidemic diseases, he says that nothing must be done without a plan, a method, nothing must be overlooked: medén eiké, modén huperoren. In the same chapter he says that similars should be used, for one pain reduces another pain: ergásasthai tó hómoion, hoíon odúne odúnen paúei. This is homeopathy. Then, in the same sentence, he goes on to say that dissimilars should be used, as when a thing presses upwards it should be loosened downwards: tá anómoría én rhépe ánothen arthénta, kátothen lúein. This is allopathy. In Chapter I. of his work on the winds, he says that contraries are remedies for contraries: tá enantía tōn enantíon estin iémata. This is antipathy. In Chapter XVIII. of his work on the holy disease, epilepsy, he says that most diseases are curable by those agencies through which they originate: ákestá te tá pleistá estin toútoisin aph' hóton kaí ginetai. This is isopathy and the principle of modern bacterial therapeutics.

We have here the statements by the Father of Medicine of all the principles entering into the make-up of modern scientific medicine. These statements have been repeated in the post-Hippocratic era with more or less varying emphasis. Theophrastus said that diseases are best treated with similars. Galen taught that to maintain health we require similars and to overcome disease we require contraries. Paracelsus taught the application of similars rather than contraries. But throughout all the Hippocratic and post-Hippocratic era no one gives conclusive directions as to how to know contraries from similars and similars from contraries until we come to Hahnemann.

Hippocrates is silent on this point. Galen says that the same elementary qualities that may be recognized in the human body, that is, heat, cold, moisture, dryness, etc., are to be recognized in drugs: "Given a disease, determine its character as hot or cold, moist or dry, by an effort of imagination; having done so, select a remedy which has been catalogued as possessing opposite qualities." For instance: Opium is cold, hence causes cold, and to overcome this coldness, it must be mixed with a remedy which is hot, like castoreum. Paracelsus took the physical resemblances to certain parts of the body as the indication for the use of drugs. For instance, the orchidaceous plants, like satyrion, resemble the shape of the testes; therefore, satyrion is indicated for affections of the testes. We are told that as a woman is known by her shape, so the medicines are known by their shape. Sylvius and Willis gave drugs as acids and alkalis. Chemistry had not yet disclosed the constitution of drugs. Drugs were given because of their taste, odor, or other sensory attributes and their medicinal value was derived from crude empirical trial on the sick without definite, undoctrinal indications. It was time that Haller should suggest that if we wish to know how to use a drug in sickness, it is necessary first to test it upon human beings that are in health.

Heraclides of Tarentum had written a book on the symptoms caused by the bites of poisonous serpents, and King Mithridates of Pontus had instituted experiments on himself and on criminals for the purpose of learning the action of various poisons, but it remained for Samuel Hahnemann, the son of Meissen and the physician of Leipsic, to make the first complete test of a drug in the healthy human body on himself during the year 1790. As his experiment, he took four drachms of china, good Peruvian bark, twice a day. He found that this was productive of all, not of one, nor of some, but of all the symptoms, general and specific, that characterize paroxysms of certain kinds of intermittent fever, which we have since learned china will overcome. The paroxysms lasted two or three hours each time. They recurred when Hahnemann repeated the dose; they did not recur when he did not repeat the dose. He had discovered that drug effects were like disease effects, that drugs produce in the healthy human body not merely one symptom, but series of symptoms, subjective and objective, corresponding to entire disease pictures.

In Hufeland's *Journal der praktischen Arzneykunde und Wundarzneykunst* of 1796, volume II., parts 3 and 4, Hahnemann published his Essay on a New Principle for Discovering the Curative Powers of Drugs. In this essay he says distinctly that every powerful medicinal substance produces in the human body a peculiar kind of disease, and the more powerful the medicine the more peculiar, marked and violent the disease.

The effect of bringing drugs, for the first time in the history of medicine, within the category of observable perturbations of the physiological life similar to the perturbations of the physiological life recognized in disease was as far reaching as was the effect of the Hippocratic discovery that diseases are of natural origin. When, on one side, we have the incontrovertible facts of disease, the subjective and objective symptoms of the diseased organism, and, on the other side, we have the incontrovertible facts of drug-remedies, the subjective and objective symptoms they produce on the healthy organism, we have the incontrovertible premises for a scientific, therapeutic conclusion and precise application. The discovery that Peruvian bark known to cure ague caused in a sensitive healthy person a disease indistinguishable from ague led to experimental provings of drugs on man and animals until it has become an axiom of modern pharmacology that drug proving is the only true basis of drug using; led to a rational understanding of pathology and therapeutics, to the scientific understanding that gross anatomic lesions are not all there is to pathology, to the further understanding that not even the most careful analysis of the results obtained in the sick room is all there is of therapeutics; led to a more and more correct estimate of the great and varying virtues of drugs properly applied, to the gradual dawn on the medical mind that medicines are not to be given in sickness in order to find out what they will do, but are to be given because of what is known that they can do; led to the precise, discriminating, scientific practice of pharmacotherapeutics, a science and art of comparisons, to the knowledge that drugs have a direct affinity for diseased parts, that monopharmacy is more scientific and more effective than polypharmacy, that the small dose is more justified than the large dose; led to the most helpful, the most rational attitude the medical mind has ever taken, to the attitude

of modern scientific medicine in which it becomes the duty of the physician to practice his art because of his science, to adjust the human mechanism according to anatomic and physiologic tenets and requirements, to substitute the curative affinity of drug energy for the injurious activity of disease energy.

There is need to understand the certainties and the limitations of the various forms of therapeutics, both drug therapeutics and drugless therapeutics. The scientific practice of medicine must have its scientific theorems, its laws, declarations of facts explained by larger facts and connected with related facts, truths disposed in the best order for thought, and must have its practical injunctions, its rules, directions how best to attain the end, truths disposed in the most convenient order for practice. We must have "fixed, definite and consummate" rules, as Sydenham expressed himself, to guide us in our practice. It is not sufficient to produce observations and experiments. The machinery that produces only observations and experiments becomes tiresome. Its constant grinding becomes monotonous. It leads nowhere. Even so-called original observations and experiments, often made to order, are usually valueless, and usually anything but original. It is scientifically not profitable to make and consider and reconsider observations and experiments just for the sake of making observations and experiments. Mere repetition, mere multiplication of observations will not make truths. Observations must be made into facts. These facts must be brought into cogent, correct relationship with other and larger facts. We must cement our medical facts or we miss the end for which these facts stand.

To-day, therefore, more than ever before, we require the breadth and thoroughness of judicial clinical research in order to separate from the maze of medical observations, heaped up without order and without logical evidential purpose, the true from the false, the useful from the misleading. Most of the research work, such even as is done under most exalted auspices and with the most generous equipment, falls by the wayside for the sole but sufficient reason that it is not conclusive medical research work. No stretch of imagination or fabulation will make a mere repetition of work, such as has been going on for years in pathology, pharmacology, physiology, chemistry, diagnosis, therapeutics, conclusive medical research work. No stretch of imagination or fabulation will make crude investigations bent on discoveries, as though we could force discovery or crude investigations made because of the attraction of a momentary, apparently novel idea, conclusive medical research work.

Discovery is one thing and research is quite another thing. Investigation is one thing and research, re-investigation, is quite another thing. Research proper is the re-investigation and analysis of facts already ascertained and more or less fixed in order to deduce from them and fix for present and subsequent time the principles underlying the facts.

Clinical research is not necessarily the making of new clinical facts, but the production, fixation and analysis of clinical data which may have been discovered, rediscovered, observed and re-observed untold times before.

Is any conclusive clinical end served by such work, for instance, as that published under the auspices of the Committee on Therapeutic Research of the Council on Pharmacy and Chemistry of the American Medical Association? Therapeutic facts ought to be and can be made as plain and conclusive as pathological facts. The collection of facts in therapeutics ought to be as unmixed with prejudicial assumptions as the collection of the symptoms and signs of disease in the examination of our patients.

Is any conclusive clinical end served by such work as that of Ehrlich and his new school of iatrochemists? There is no parasitotropic or organotropic theory needed for the production or collection of therapeutic facts.

Is any conclusive clinical end served by such work as that of our big research institutes when their cures, heralded all over the world, must after years of painstaking investigation, called research, be admitted as failures?

Is any conclusive clinical end served by such "research" work as transplantation of whole organs, like the kidney or the stomach, when it is apparent that somebody must lose such an organ before it can be transplanted?

The whole trouble rests in a misunderstanding of the applicability of the various methods of investigation that are at the disposal of the medical man. Modern medicine has been called experimental medicine, and it has been pointed out with pride that experimental medicine is as much superior to observational medicine as scientific medicine is to empiric medicine. But what is experimental medicine? What is an experiment?

We experiment for the purpose of verification, to test some hypothesis, or for the purpose of discovery, to discover something new. We place the objects we experiment with in new, factitious relations, have them undergo certain arbitrary changes. If these meet the hypothesis, the hypothesis is proved. If they do not meet the hypothesis, the hypothesis is not proved.

Medicine furnishes no hypotheses for experimentation. Experimental medicine or so-called experimental "research" seeks discovery. Mere discovery has nothing to do with clinical research. On the other hand, verification has everything to do with clinical research; and for verification we require a sufficiency of relevant facts which are precise and complete in their make-up.

For clinical verification, a sufficiency of precise and complete relevant facts cannot be obtained either by the simple observational method or the artificial experimental method. The simple observational method fails because observations of vital conditions cannot be reproduced in their identity and observations, however often repeated, of unidentical conditions can bring forth only unidentical results, disputes and not agreements. Goltz used to say that there are hardly two physiologists who will have the same view on the same subject of observations and phsyologists, more than most clinicians, are experimenters as well as observers. The artificial experimental method fails because experiments are not necessarily warrants for exactitude or of sufficiently wide validity. Experiments fail mostly because they supply with insufficient clinical evidence an unnecessary and often in applicable theory to fill the void left by the insufficient clinical evidence. The necropsy table presents only stationary phases of disease and leaves out the process of the disease. The laboratory takes a part from the whole and we cannot prove a whole from a part. Experiments on animals attempt to prove facts in one species by facts in another species, and this is of course impossible. Physical and chemical experiments are exact because they deal with fixed, unvarying entities, which can be reproduced by any competent individual and subjected to repeated experiment. Clinical experiments, however, have to deal with human life, which is variable and constantly varying, and the elements of which, lost for any moment, can never again be reproduced in their former exact condition by the most competent individ-

uals in the world. In order to fix human elements accurately and convincingly, we must fix them at the moment of their appearance.

This is made possible by the method of conjoined clinical observation and experimentation adopted by the American Association of Clinical Research: Two men make their observations and experiments simultaneously and independently on the same patients; record the present history of the patients (the subjective complaints, general appearance, objective signs), the past history (the prodromata, habits of life, previous diseases), the family history (parental, collateral), the diagnostic conclusion (pathological, anatomical, etiological), the therapeutic management (indications, applications), the daily course (phenomena, treatment), the termination and result (cessation of complaints, resolution and disappearance of signs, improvement, cure, non-improvement, and in case of death, whenever possible, the post-mortem phenomena). The recorded data are correlated and analyzed for the deduction of the facts and principles contained in the recorded observations and experiments.

The conjoined clinical method carries with it immediate, continuous, step-by-step observational and experimental verification. The corrective observation takes place at the same time that the original observation is made, and, therefore, the observations leave no doubt as to whether they furnish either true natural facts resulting from direct observation or mixed facts and inferences resulting from acquired unconscious or prejudicial perceptions. The corrective experimentation also takes place at the same time that the original experiment is made, and, therefore, the experiments leave no doubt as to whether they reproduce the original combinations of circumstances in their entirety or only partially, whether they are sufficiently wide validly or not. Analysis discloses whether the observations and experiments contain true facts and principles or fallacies of observation and reasoning. The facts and principles become of necessity the property of the medical world.

In the structure of scientific medicine, every proved part is bound to have its relative place. There is no question of superiority. There is only the question of relativity. There is no superiority in the methods of experimental research except in the minds of those who do not understand the methods of research. There is no superiority in the method of simple observation except in the minds of those who would not look beneath the surface. Both observation and experiment, both clinic and laboratory, are needed for correct and comprehensive work.

With the path-making discoveries of Hippocrates and Hahnemann, we can bring diseases and remedies within the category of observable phenomena. Once done, all the rest of medicine follows as a mere matter of course.

419 Boylston Street.

Need for More Blood Tests.

In speaking of the value of blood tests in malaria, Jackson (*Interstate Med. Jour.*, Nov., 1912) says that during the year 1909, in a large laboratory connected with a metropolitan hospital, where more than 20,000 new patients from all corners of the globe were treated, and where a special feature is made of the teaching of malaria, but 58 of 12,000 laboratory examinations made (about 4/10 of 1 per cent.) were blood examinations for malaria. This is something of an index of the failure of physicians generally to make use of the most direct and infallible diagnostic procedure in medicine. Excepting hospital and dispensary practice, it will be found that blood-searches for malaria parasites are even less frequently made.

PUBLIC HEALTH, THE D. P. H. AND THE COURSES OFFERED BY MEDICAL SCHOOLS.

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Probably no one legislative act has done more to arouse a wide interest in the prevention of the spread of disease than the abolishment in traveling conveyances and in public places of the common drinking cup and the substitution of a paper envelope. The thirsty passenger sees the sign, "Ask the porter for a cup," or he faces a new device alongside the reservoir from which he is expected to extract, with more or less difficulty, accompanied at times with very frank expressions of his opinion, a paper receptacle. The novelty, the unsatisfactory paper cup and the slight discomfort are great educators. They set him to asking questions, to thinking or to reading so that he may, in the future, appear less verdant and at the same time carry his own cup.

Insignificant as it may seem, nevertheless the bubbling fount on the street corner is enlightening the illiterate, its presence in institutions of learning does more to cause the student to think of hygiene than the lecture does; it is a potent factor in other ways as a means of preventing the spread of contagious diseases.

The individual cup is only one of the straws that not only shows the existence of a wind but also the direction in which it is blowing. We might mention as other straws the work of the Committee of One Hundred; the efforts to pass the Owen bill; the space given to preventive medicine in general and editorial articles by the medical and lay press; the issuance to policyholders of health bulletins by some of the insurance companies; the growing demand for competent sanitarians; and, finally, the efforts made by some of our prominent medical schools to prepare, in a very efficient manner, specialists who will act as health officers either in cities or in other institutions.

In our efforts to arouse interest in preventive medicine we soon find that the field is less attractive than that of medicine or surgery. The unappeasable hunger of the human mind is for the dramatic—prevention does not furnish this element. It is the man who cures, who performs some marvelous operation who receives the curtain call. Again, we must not forget that it costs more to cure than to prevent, and any attack upon a man's pocketbook will cause him to guard it in every way.

The establishment of a general federal headquarters for the dissemination of health literature or to supply expert advice will be an excellent step forward, but it will not be the whole thing.

The people must be educated, the college student forewarned and forearmed, the schoolboy put on his guard, so that when the time comes the mass of people will be ready to act. Then the ballot will be most effective.

It is with the efforts of the medical schools, however, that this article will deal.

Of the several attempts to arouse a healthy interest in proper sanitation no one stands out more prominently than the efforts of the medical schools to equip good men.

In England the big universities have for many years offered courses in hygiene leading up to a degree known as the "Diploma of Public Health" (D. P. H.). They do not give a doctorate degree.

The universities at Oxford, Cambridge, London, Liverpool, Manchester, Edinburgh, Glasgow, Aberdeen,

Birmingham, Bristol, Leeds, are among the thirty-six institutions in Great Britain where courses or examinations are given for this diploma. In London alone there are twelve colleges or hospitals where one may prepare himself to come up for the Cambridge tests. Not only may the applicant take the preliminary training in England, but also in a number of foreign districts recognized by the General Medical Council, namely, at Gibraltar, Hong Kong, Cairo and eight divisions in India and Burma.

A somewhat complete description of the work offered at Cambridge will suffice to partly answer the question, "What are the American institutions doing?" The courses of study are practically the same at all universities where high grade effort is demanded.

The differences are those of minor detail as to cost, time and previous preparation. The requirements for the American Doctorate in Public Health are more exacting than those for the English diploma, or for the Master of Science in Public Health given in this country.

At Cambridge any person possessing a registered qualification in medicine, surgery and midwifery may be a candidate providing he has had a certain amount of instruction in approved laboratories where chemistry, bacteriology and the pathology of diseases of animals transmissible to men are taught.

The applicant is expected to spend nine calendar months in study and special preparation, after which period he presents himself for two examinations. The first, held in April, 1913, weeks of the second and seventh; the second, in October, 1913, weeks of the sixth and thirteenth.

The first part of the examination will have reference to the general principles of sanitary science and will comprise these topics:

The elements of chemistry and physics; methods of chemical analysis. and in particular the analysis of foods, air, water and sewage. The laws of heat and the elements of pneumatics, hydrostatics and hydraulics in their application to warming, ventilation, water supply and drainage. The geological and other conditions determining the healthiness of sites for dwellings. Sources, storage and purification of water supply. The elements of meteorology in relation to health. The effect on health of season and climate. The general principles and chemistry of sewage disposal. Disinfectants, their chemistry and use. The microscopical examination of foods and the detection of the commoner forms of contamination. Effects on health of overcrowding, vitiated air, impure air, polluted soil and bad or insufficient foods. The methods of bacteriological investigation and analysis. The bacteriology of air, water, food and soil. The general pathology of infection, and of diseases of animals that are transmissible to man.

The second part of the examination will have reference to State medicine and to the applications of pathology and sanitary science, and will comprise the following subjects:

Laws and statutes relating to public health. The model by-laws of the local government board. Sanitation of dwellings, schools, factories and workshops, and of villages and towns. School hygiene. Inspection of slaughter houses, cow sheds, etc. Inspection of meat and other articles of food. Principles of building construction in their application to dwellings, hospitals and schools. The general principles and practice of sanitary engineering. General epidemiology with special reference to the origin, pathology, symptoms, propagation, geographical distribution and prevention of the epidemic, endemic and other infective diseases both of temperate and tropical climates. The methods applicable to the medical investigation of epidemics. Unwholesome trades and occupations and the diseases to which they give rise. Nuisances injurious or dangerous to health. The principles and methods of vital statistics in their relation to public health.

The examinations are oral and practical as well as written.

Full particulars concerning the English courses may be had from Mr. J. E. Purvis, M. A., secretary to the State Medicine Syndicate, Chemical Laboratory, Pembroke Street, Cambridge, England.

At Harvard University the medical school is offering courses which lead up to the degree of Doctor of Public Health (Dr. P. H.). The degree of Bachelor of Arts or its equivalent is required in addition to that of Doctor of Medicine.

All candidates for the degree of D. P. H. must be able to read French and German, and if not holders of the M. D. from Harvard must present equivalents of courses taught at Harvard, which are: Bacteriology, medical zoology, protozoology, entomology, human pathology, comparative anatomy, biological chemistry, preventive medicine and hygiene and physiology. Clinical work upon communicable diseases. The above may be taken as fourth year work at Harvard.

The situation at Harvard is concisely stated in their special circular from which the following is quoted:

"On June 22, 1910, the President and Fellows of Harvard University authorized the Faculty of Medicine to offer a course leading to the degree of Doctor of Public Health (Dr. P. H.).

The object of the course is to prepare candidates for several lines of public health work, such as administrative work, laboratory research, or teaching.

Candidates for the degree of Doctor of Public Health are advised first to take the course leading to the degree of M. D. The fourth year of the medical course should be devoted to advanced work in bacteriology, protozoology, human and comparative pathology, preventive medicine and hygiene, etc. Opportunities will be offered for the study of infectious diseases, both human and animal, and students will familiarize themselves with the practical and administrative work of public health organizations.

Candidates for the degree of Doctor of Public Health who are graduates in medicine must spend not less than one year in work upon a special subject and present an acceptable thesis containing the results of original research.

Candidates may be admitted to advanced standing, and special courses will be arranged to suit individual cases. Credit for work done at other institutions may be given in considering applications. The courses leading to the degree of Doctor of Public Health need not be confined wholly to the medical school but may include work offered in any department of the university in harmony with the objects of the course.

While candidates for the degree of Doctor of Public Health are advised first to take the medical courses, the medical degree is not a prerequisite. Those who desire to specialize in sanitary engineering, sanitary architecture, sanitary chemistry, vital statistics, or other branches of public health work may receive the degree after four years of work including an acceptable thesis embodying the results of original research.

A minimum of one year of residence is required.

For further information address the chairman of the

committee on the degree of Doctor of Public Health:
M. J. Rosenau, Chairman,
Professor of Preventive Medicine and Hygiene."

The University of Michigan, in addition to the degree of Doctor of Public Health, gives a degree of Master of Science in Public Health. Their circular, which is very complete, gives the following preliminary statement:

"In response to a growing demand for special training along the lines of public health work the following courses have been outlined, and upon the completion of which degrees will be conferred as follows:

Upon the completion of Course I the degree of Master of Science in Public Health.

And upon completion of Course II the degree of Doctor of Public Health.

The following outline of the courses is given:

Course I. A one year course leading to the degree of Master of Science in Public Health. Candidates must possess the degrees of B.S. or A.B. and M.D. The course of instruction covers one academic year, beginning with the opening of the University in the fall, and continuing until the following June. Work in the Summer School following the granting of the degree of M.D. may be credited on this course. At the close of the course an examination, both theoretical and practical, will be held, and a diploma of M.S. in Public Health will be given to all who successfully pass the examinations and show fitness for work in public health. In addition to the taking of the prescribed courses and the successful passing of these courses the candidate shall carry out a piece of original investigation of sufficient value, and shall present a thesis on the same, and successfully defend this thesis.

Course II. Course leading to the degree of Doctor of Public Health. Candidates must possess the degree of A.B. and B.S. in addition to that of M.D., and must pursue a course of two years after the degree of M.D. has been received. The first year's course is identical with that prescribed for the degree of Master of Science in Public Health. The second year's work must be spent in research work in one or more of these subjects, with the presentation of a thesis containing original work of sufficient merit, which must be passed upon by and defended before all the members of the Faculty concerned in the giving of the courses. The final examination will cover the branch or branches of the first year's work, and can be held at the end of the first year. A portion of the prescribed work may be taken elsewhere, but the right to do this must be left with the Faculty giving these courses."

The University of Pennsylvania says, in the special circular which it issues:

"One of the results of the universal campaign of education in questions of personal, municipal and State hygiene, is an increasing demand for the services of trained men as public health officials.

Preliminary training for this service is as essential to a full understanding of the manifold problems and the correct performance of duties, as it is for any of the other special branches of medicine or its allied sciences.

The authorities of the University of Pennsylvania, appreciating the importance of this movement, and knowing training to be the only safe foundation for a career in any scientific field, offered in 1906 courses of instruction specially designed for the practical Sanitarian.

This course of instruction covers one academic year, beginning with the opining of the University in the fall and terminating with its close the following spring.

At the close of the course an examination, both theoretical and practical, will be held, and the degree—Doctor of Public Hygiene (D.P.H.)—will be conferred on all Doctors of Medicine who demonstrate fitness.

Only persons holding the degree of Doctor of Medicine are eligible to the full course and entitled to the diploma.

To those participants in the course who do not hold a medical degree and who are, therefore, ineligible to strictly medical subjects in the course, a certificate, designating them as Certified Sanitarians, will be awarded; providing, such work has been done by those falling in this category as will justify the authorities in making the award.

Anyone possessing the preliminary qualifications may take instruction in single subjects of the course. To such persons a certificate will be issued, stating exactly the work done."

A selected faculty of twelve specialists supervise the work in the Department of Preventive Medicine. The subjects taught are those mentioned in the Cambridge list with few changes.

The University of Wisconsin is giving courses leading to a doctorate degree in Public Health. We quote briefly from the prospectus.

"The degree of Doctor of Public Health (Dr.P.H.) is open to holders of the degree of Doctor of Medicine from medical schools recognized as maintaining satisfactory standards. Candidates for the degree of Dr. P. H. must spend at least two years in the study of sciences related to hygiene and public health, subsequent to the regular medical course. The last of these years must be spent at Wisconsin and be devoted chiefly to work upon a special subject leading to a thesis containing some original research acceptable to the Executive Committee of the Medical School. The general requirements for the degree are essentially similar to those specified for the degree of Doctor of Philosophy with the following exceptions:

1. The language requirements are those maintained for the B.S. degree (Medical Science Course).
2. The time requirements are as outlined above.
3. The preliminary examination of the candidate is to be conducted by and his thesis approved by the executive committee of the medical school as well as by the department in which the major work is taken."

Tulane University in New Orleans, while not giving degrees, does offer excellent courses in hygiene. A certificate of work accomplished is issued to those who complete the prescribed studies.

The special circular mentions a faculty of fourteen and presents topics carefully chosen and well co-ordinated.

A brief summing up shows that most of the English Universities give the Diploma of Public Health (D.P.H.) after one college year's work, but do not offer a Doctorate. Several American universities confer the Doctor of Public Health degree, and one the Master of Science in Public Health. There is no record of our medical schools offering the Diploma of Public Health.

In this country the B.A. degree or its equivalent is demanded in addition to the M.D. if the Doctorate is earned.

The list of studies, being about the same in all instances, is not repeated, but will be found quite complete under the description of the courses at Cambridge, England.

A member of the University of Pennsylvania faculty stated recently that there was a good opening for every graduate from the Department of Preventive Medicine.

Current Orientation

TYPHOID FEVER.

While 1912 did not produce any startling additions to literature on typhoid fever, the results of antityphoid vaccination emphasized the extreme value of this prophylactic measure. Unfortunately many people decline vaccination until too late, and the medical profession is likely therefore to treat the disease for some time to come.

Typhoid is a preventable disease and is usually traced to infected water, milk or oysters or to a typhoid carrier. In Europe the disease is dying out, and during the past year practically nothing of real interest has appeared on the subject in European medical journals.

The contrast between Europe and America in the prevalence of typhoid was carefully brought out by McLaughlin on the "Eradication of Typhoid Fever" (*Boston Med. and Surg. Jour.*, May 23, 1912). He gave a list of 15 principal Northern European and of 15 American cities showing that, whereas typhoid fever in Europe is responsible for from 1.3 deaths per 100,000 inhabitants in Edinburgh to 5.6 in Paris, in America the mortality varies from 8.8 in Cincinnati to 58.7 in Minneapolis. McLaughlin attributes this high death rate to the inferior water supply of many American cities, and to the large amounts of milk drunk by the average American. He also lays great stress on the "carrier," but, it is satisfactory to note, he relegates this source of infection to its proper place, that is to say, he does not unduly emphasize it in comparison with water or milk infection. He suggests, however, that persons engaged in occupations involving the handling of food and drink in dairies, restaurants, etc., should at least be subjected to a Widal test, with a view, presumably, of examining the urine and feces of those who present positive reactions.

C. W. Gould and G. L. Qualls, St. Louis (*J. A. M. A.*, February 24), tested convalescents from typhoid to ascertain the proportion who are carriers of the disease. In making the investigation the feces, urine and saliva were examined, and in male patients the prostatic fluid was also examined. In addition to this they have studied the blood, taking into consideration the opsonic index, Widal reaction, the white blood-cell and the different counts. The fact that 20.5 per cent. of the patients examined were carriers does not prove that they were chronic carriers, but does show that a large number of patients left the hospital as carriers. They feel quite certain that some of the patients were excreting bacilli in their feces, though bacilli were not discovered, owing to the imperfections of the mediums used. Their conclusions are summed up as follows: "1. A large percentage of typhoid convalescents leave the hospital as carriers. 2. The gall-bladder is the harboring place of the bacilli, which are excreted in the feces. 3. The prostate gland is a factor to be considered in the male, as it excretes bacilli into the urine. 4. People may expectorate typhoid bacilli. 5. Hesse's semisolid medium, as modified by Stokes and Hachtel, is ideal for the examination of the urine and prostatic fluid. 6. The solid color-reaction mediums are better adapted for stool examinations, because of the large variety of motile organisms contained in the stool. 7. The leukocyte count of carriers is normal, averaging 8,000. 8. The opsonic index and percentage of large mononuclear leukocytes were increased in our series of cases. 9. The agglutination of typhoid bacilli on the part of the serum in convalescents from typhoid or in the chronic carrier bore no relation to the carrier."

Bigelow (*J. A. M. A.*, May 4), says most typhoid carriers show a persistent positive agglutination reaction. He identified the cause of an epidemic by examining suspected persons.

In discussing the subject the *Practitioner*, August, 1912, asks how many patients ultimately become *chronic carriers* and quotes an admirable article by Hutchinson (*Medical Chronicle*, January, 1912), who examined the feces and urine of 50 cases at suitable intervals, and, comparing his results with those previously obtained by Drigalski and by Gaehtgens and Bruckner, comes to the following conclusions: First, that 2 per cent. of typhoid fever patients become chronic bacillus carriers; second, that 8.3 per cent. of patients are excreting the causal organisms at or about the time of their discharge from hospital; and third, that 6.3 per cent. of these do not continue to be infective for more than one month from that time. These results appear, on the whole, very reassuring, as it is reasonable to suppose that of the 2 per cent. chronic carriers only a limited number are likely to have much to do with the preparation of food for others. While it would be foolish to decry the importance of the carrier case, it is not necessary to regard him as a very frequent source of infection. Kerr of Edinburgh states that in his experience of 18 years in Edinburgh, "return cases" of typhoid have been unknown, and the fever does not seem to have clung to particular houses in such a way as to suggest that carriers have played any considerable part in the dissemination of the disease in the city.

Gaehtgens (*Berl. Klin. Woch.*, February, 1912) examined 528 cases bacteriologically, and he summarizes his results of agglutination, blood culture and culture from feces. The agglutination results improve with the course of the illness, being 84 per cent., 84 per cent., and 90 per cent., for the first three weeks, respectively, and 100 per cent. for cases examined later. Blood-culture was positive in 48 per cent., 35 per cent., and 38 per cent. for the first three weeks, respectively, and in 20 per cent. later. Fecal examination was successful in 33 per cent., 44 per cent., and 53 per cent., for the first three weeks, and in 52 per cent. later. These figures give a good comparative idea of the value of the different methods of diagnosis, and it must be remembered that the specimens were in most instances sent to the laboratory from practitioner, and that, in hot weather, delay was liable to cause bacilli in the feces to be overgrown by other organisms.

Another interesting table shows the results of bacteriological examination after death. Twenty-six cases were examined post mortem, three of which were bacillus carriers. Bacilli were obtained in eight out of 12 cases in the duodenum, in 12 out of 22 in the jejunum, in five out of 18 in the ileum, in four out of 20 in the colon, and in one only out of 10 in the rectum. The diminution of the figures as one progresses down the intestinal tract is somewhat remarkable. It is to be noted, however, that the bile gave 17 positive cultures out of 19 cases examined. In six cases out of eight bacilli were also obtained from the mesenteric glands.

Ker feels that we may see the necessity of revising our ideas on the value of the ophthalmic diagnostic reaction for typhoid fever, and he quotes Austrian (*Bulletin of Johns Hopkins Hospital*, January) regarding a "typho-protein," which can only be made by a skilled bacteriologist. It is manufactured from a very large number of different strains of typhoid bacilli, killed by heat, emulsified, and finally dried and ground to powder. A solution of from one-third to one-half of a milligramme is instilled into the conjunctival sac; in the

case of a person ill with typhoid fever, this causes a typically inflammatory reaction, which appears in from one to five hours, reaches its maximum intensity in six hours, and persists for about 24. The typical response is deep purple congestion of the caruncle and the palpebral conjunctiva of the lower lid. In conditions other than typhoid the inflammation, if present, affects the caruncle less and the bulbar conjunctiva more, and purulent reactions are more common. The results of the test closely correspond with those of blood cultures, and the reaction is of greater assistance than that of Widal in early diagnosis. Austrian employed it in 75 cases of typhoid fever and in 190 persons, either normal or suffering from other diseases. It may be noted that the results appear to be beyond question, and that in the vast majority of negative cases there was no visible reaction at all. The solution of typho-protein has to be freshly prepared, as it keeps badly, and, until a reliable and permanent stock solution can be obtained, it is difficult to see how the test can be useful, except in hospitals; but, doubtless, this difficulty will ultimately be overcome.

Interest in Russo's urine test for typhoid (adding 4 drops of 1—1000 watery solution of methylene blue to four or five cubic centimetres of urine, an emerald green color being obtained if the result is positive) is reviving. Rankin (*The Hospital*, April 27th, 1912), finds it persists longer than the diazo reaction, that its intensity sometimes is an index of the severity of the case, and that it is of no value in prognosis. It is also found in pneumonia, measles, empyema, and, occasionally, in scarlet fever. This view is corroborated by Rolph and Nelson (*Medical Record*, August 9, 1911), who believe the test efficacious if applied sufficiently early.

Grover (*Boston Medical and Surgical Journal*, May 9, 1912) on the other hand is of a contrary opinion, as he found the test positive in 110 persons, 84 of whom were presumably normal.

Lemaire (*Gaz. heb. des. Sci. Med.*, xxxiii, 1912) does not see much value in the test and Ker (*Practitioner*, August, 1912) finds that there is great difficulty in making the necessary color distinctions, as the blues and greens are often not well-defined, and the pigmentation of the urines examined seemed to make a great difference to the result. Ker states that the simplicity of the reaction would certainly commend it, if it was even reasonably reliable, but, after a year's trial in his wards, he discarded it. It is possible, however, that the renewed interest taken in the subject will lead to more extensive observations.

The treatment is tending more and more toward the vaccines and the ordinary point of difference in opinion is in the size of the dosage. Some men favor two millions as a first dose and then one million subsequently at four or five day intervals. Others advise doses of from 50 millions increased to 150 millions.

An interesting accessory treatment is reported by Booth (*Yale Medical Journal*, January, 1912) in transfusion for typhoid hemorrhage in an 8 year old girl. Temperature on admission to New Haven hospital was 103°, pulse 120 and respiration 30. The Widal was positive and the white count 4,600, urinary S. G. 1.022. She suffered a severe attack and on the morning of the twenty-fourth day had a hemorrhage, losing from six to eight ounces of arterial blood and passing several clots. The same afternoon she had another hemorrhage of six ounces and the child's condition became very serious. A subcutaneous injection of 700 Cc. normal saline solution did not improve matters and transfusion was decided on, an uncle being the donor.

It was found impossible to locate the veins in the child's arms, because of the very little blood which they contained, so the right internal saphenous was dissected out, and joined to the donor's right radial by means of the Elsberg canula. The blood was allowed to flow for about one hour, the operation consuming in all about one hour and a half.

The result was astonishing, and was obtained almost immediately, as the condition of the child could be seen to improve from almost the moment the blood began to get into her circulation. Her tongue, which had previously appeared absolutely bloodless, assumed a good red color, the color came back into her cheeks, the blood vessels in her ears could now be made out, and her finger tips were of a good pinkish tinge. The patient left the operating table with a temperature of 98.6, a pulse of 120, and of good quality, respirations at 26, and a color which was very markedly improved. She was put to bed with orders for only cracked ice by mouth and an ice bag to the abdomen constantly. The donor felt perfectly well after the operation, and was able to walk home.

The patient slept well and the next day voided six ounces of dark blood per rectum. After this the stools took on more of a fecal odor, with no signs of hemorrhage and in six weeks from the time of admission the child was discharged cured.

In commenting on the case Booth brings out some points of interest. On the day of entrance, the white count was found to be 4,600. A second examination was not made until after the first hemorrhage, when the white count was found to have increased to 9,600. The hemoglobin had not been taken previously, but now proved to be only 32 per cent. This does not, however, represent the base line, as the second hemorrhage was more severe than the first and though the hemoglobin was taken again, judging from the patient's color, the hemoglobin must have dropped as low as 10 per cent. The differential count after the first hemorrhage showed P., 75 per cent.; L.M., 5 per cent.; S.M., 18 per cent.; Ba., 2 per cent.

The day following the transfusion, the red count which, unfortunately, was not taken previously, was found to be 2,736,000 and the white count showed a still greater increase to 14,500. The hemoglobin the most interesting feature of the blood picture, had increased to 45 per cent., a very marked improvement, remembering that the base line was not 32 per cent. before the transfusion, but considerably lower. The differential count showed a polynuclear leucocytosis of 72 per cent. and the smear revealed a slight polychromatophilia and the presence of two normoblasts. Three days later the red count had decreased slightly to 2,240,000, which can perhaps be explained by the fact that hemolysis probably occurred late. The hemoglobin was still 45 per cent., showing no increase. Three days before the patient was discharged the red count had increased to 3,840,000. The hemoglobin was not taken, but judging from the patient's appearance it must have increased considerably.

In summarizing the interesting features of this case, it will be seen that the patient had a typical and serious attack of typhoid, resulting in two severe hemorrhages on the twenty-fourth day of the disease. The reaction of the patient to the acute hemorrhage was perfectly typical, with a sub-normal temperature, a scarcely palpable pulse of high rate, cold, clammy sweats and intense thirst. The use of ordinary therapeutic measures such as hypodermoclysis, injections of rabbit and human serum, and the administration of calcium lactate were without any marked effect on the progress of the case,

although just how much benefit the patient derived from them, of course, cannot be definitely determined. But with the patient in extremis direct transfusion was done with a related blood and a really remarkable effect upon the vital signs of the patient resulted. The temperature rose to normal, the pulse improved in quality, and dropped to the approximate level established before the hemorrhages occurred.

The transfusion had no effect on the course of the typhoid, as is shown by the recurrence of the temperature three days after the transfusion, and a continuation of the lysis which was already inaugurated before the hemorrhages occurred. What the transfusion did was to restore the ground lost by the patient from the acute depletion of the cardio-vascular system. The donor had never had typhoid, and the results in this case suggest the interesting speculation of the possible good to be obtained from the use of a donor who had previously been immunized to the disease. It is certain that this experiment should be made in any successive similar attempt.

The diet in typhoid is well outlined by B. R. Crohn, New York (*J. A. M. A.*, January 27), who gives his experience with some thirty cases in the use of the Coleman-Shaffer diet. He describes the general principles followed by him, and gives samples of an outline of the average diet and of one more liberal, with their caloric values. The attempt to institute a diet of high caloric value was sustained in the main part by offering liberally three articles of food, namely, lactose, cream and bread and butter, but other things were also employed, eggs, soup, etc. The diet was naturally well taken by the patient, and, except occasionally, without untoward results. Occasionally there was a complaint of nausea and sometimes diarrhea, which was corrected by reducing the diet. There were no serious complications and no case of perforation. Convalescence was more rapid. The general conclusions drawn from this limited number of cases, offered tentatively on account of the limited number, are: 1. The diet is a practical one and well taken by the patient. 2. The nutrition of the patient remains in all but the most severe cases unusually good. 3. Most cases show a slight loss in weight; this result, differing somewhat from that of Coleman and Shaffer, is accounted for in part by the author by the larger amount given and the higher protein value of the food. He thinks that the maintenance of weight in the series of Coleman and Shaffer was dependent on a liberal carbohydrate diet with an abnormally high protein proportion. But in some individual cases, in spite of this fact, a small loss of nitrogen is unavoidable. This last nitrogen loss is undoubtedly a part of the so-called "toxic" loss of nitrogen so often referred to and quoted. 4. The period of convalescence was shortened, the return of strength was rapid and the lassitude and enervation commonly seen after a serious illness was for the most part absent and replaced by a hopeful, well-nourished condition, rendering the patient anxious to return to his duties. 5. The disease seems to be better tolerated. In the thirty cases observed complications were rare and there were no deaths. Of course, statistical conclusions as to frequency of complications, duration of course, etc., cannot be deduced from so limited a number. It cannot be said that the duration of the febrile period is in any way abbreviated, nor was the incidence of relapse materially altered, but that the severity of the symptoms was modified, that nutrition and strength were better maintained and convalescence shortened seems, he says, to be satisfactorily established.

The control of typhoid lies largely with our State and city boards of health. If the boards can obtain appropriations of sufficient amount to enable them to carry out the latest methods of prevention we will have a much lessened typhoid rate.

C. T. Nesbitt of Wilmington, N. C. (*J. A. M. A.*, January 4, 1913), describes the methods employed against typhoid in Wilmington, a city apparently without adequate sewerage provision and where typhoid fever has been endemic. The first efforts were made to secure fly destruction and resulted in checking an existing epidemic. Along with this was the effort to introduce the sanitary privy, which was strongly opposed. To prevent the annual recurrence of the typhoid epidemic the following plan was adopted: "Each sanitary closet-can, when removed for cleaning, was thoroughly scrubbed and disinfected, and before being replaced in a closet was filled to one-third of its capacity with a disinfecting solution of known typhoid bactericidal efficiency. In addition a circular letter was addressed to every physician in the city requesting him to notify the health office as soon as the symptoms in any suspected patient suggested typhoid, and to use every means in his power to secure the screening of the patient and the disinfection of all excreta. The health office agreed immediately on notification to cooperate with the physician in his efforts to render the case innocuous. To prevent any typhoid excreta from going through the sewers into the Cape Fear River the health office was to supply every household in which there was a case of typhoid with a steel can in which the excreta from the patient might be kept and disinfected." This plan has been in operation since May 1, 1912, and with gratifying results. While there must be a number of typhoid carriers remaining, infection from current cases has evidently been prevented to a gratifying extent. During the months of May, June, July, August and September of 1912 only fifty-nine cases have been reported, as compared with 250 during the same period in 1911. The plan adopted would be of little value in large cities, but seems eminently suited to small cities and rural districts.

C. W. G. Rohrer of the Maryland State Board of Health (*Maryland Medical Journal*, March, 1912), says polluted drinking water is the principal cause of the disease in his State and that it costs $2,000,000 annually and he believes "the only practical solution to Maryland's annual typhoid problem rests on the formation of a Bureau of Sanitary Engineering in the State Department of Health."

When the people awake to the fearful dangers of a contaminated water and milk supply, they will demand the greatest efficiency in handling these matters and efficiency in health boards, plus sufficient money to enforce prophylaxis will spell the defeat of typhoid and similar diseases.

Treatment of Acute Tonsillitis.

Harold Hays recommends the following treatment: After having sprayed the throat with an alkaline antiseptic, in order to clear away the mucus, he proceeds to spray the throat with a one per cent. solution of cocain and adrenalin 1/5,000, applied especially in the tonsillar region. Finally the tonsils are touched with pure cocain. In a few moments the crypts are opened with a crayon of silver nitrate 50 per cent., the caustic being retained in each crypt from ten to fifteen seconds. The patient is recommended to rest the following day and take a light diet, using pulverizations in the throat of a 50 per cent. solution of peroxide of hydrogen; at the same time to suck ice and to maintain a compress of cracked ice around the neck. Usually the tonsillitis clears up within twenty-four hours, although it may be necessary to repeat the treatment in some cases.

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THE FOUNDER OF INEBRIATE ASYLUMS.

The establishment of an inebriate asylum at Greycourt to which may be committed the victims of alcohol for the scientific treatment and cure of their disease—inebriety—recalls the efforts in this direction of the founder of inebriate asylums, Dr. J. Edward Turner. This pioneer was one of the greatest figures in the history of modern medicine, and his career one of the stormiest in our annals. He was the first physician to put into practical operation the treatment of inebriety as a disease. We of to-day can hardly realize the benightedness of the citizenship of his period in respect to the problem of alcoholism. Inebriety was regarded as merely sinful—its victims possessed of the devil. For years Turner fought like a lion and worked like a slave before he was able to erect the first inebriate asylum, at Binghamton, and then, after having opened it in 1864, he was compelled to leave it in 1867 through the machinations of an unfriendly board of directors whose weak minds had been poisoned by reactionaries and enemies of Dr. Turner, after having given as splendid a demonstration of scientific treatment as has since been witnessed in any institution. Crothers, in 1889 ("Sketch of the Late J. Edward Turner," *Quarterly Journal of Inebriety*), makes it clear that this pioneer was fully abreast of our own modern conceptions as regards inebriety, and writes a story of his career that is one of the most inspiring chapters in all the long history of medical heroes. So malevolent were the clerical and other enemies of this superman that when the hospital was damaged by fire during the first year of its operation he was accused of arson, and indicted. The indictment, however, was finally quashed without a trial. It was procured two years after the event. An attempt was even made to starve him and his family. He drew no salary and was dependent on the farm produce for subsistence, which produce the employees were forbidden to deliver to him.

The most remarkable facts in the career of Dr. Turner were his indomitable efforts in the direction of enlisting the support of prominent subscribers and his thoroughly modern methods of collating scientific data in respect to inebriety and basing practical applications upon them that were remarkable for their soundness, viewed in the light of present-day knowledge and practice. He left hardly anything in his field untouched or unassimilated. His personal force and capability seem to have been unlimited. Yet he was doomed to glorious defeat. Leaving Binghamton, he attempted to found another asylum in the State of Connecticut. Ground was broken for what would have been one of the most magnificent institutions of its kind now in the world, when, owing to the ceaseless activities of his old enemies, the Legislature was induced to repeal the asylum's charter, and six years' work came to naught. The Binghamton institution had required a campaign of a quarter of a century of unremitting toil on the part of this matchless genius as an organizer, as Crothers calls him. Yet even after the crushing out of his Connecticut project this man of heroic mold began anew his campaign against embattled prejudice, suffering privations and hardships in it that finally brought him to his grave, in 1889. The Binghamton institution was sold by its trustees to the State of New York for one dollar, and is now the Binghamton State Hospital for the Insane. Eminent authorities have denounced this transaction as illegal.

Included in his Binghamton project were all the modern schemes as regards farm work, gymnasia, workshops, Turkish and Russian baths, etc.

In the Pantheon of Medicine one of the highest places is now his.

The State Health Department.

To most of us the State Health Department is only a name. We have a certain abstract respect for it, but close examination does not reveal a very efficient machine. There are 900 town boards of health, with health officers on small salaries or working under the fee system, and 400 village boards of health, with health officers "paid" in the same manner. Each of the third class cities has a board of health and a health officer. Theoretically, the State Health Department controls these local boards, but as a matter of fact there is no system of inspection and no system of reporting except as to vital statistics. With its present equipment the department cannot meet its problems. Moreover, our public health law is defective when compared with the laws of some of the other States. The idea of Governor Sulzer and his special commissioner, Homer Folks, is "to bring the machinery of the department closer to the point of meeting the demands placed upon it by modern public health practice and sanitary science and to increase the co-operation between local and State authorities as well as between these and physicians." These progressive officials are also planning "to discover means of extending the benefits of trained nursing to the rural communities and to place public health administration in rural communities on a more satisfactory basis." Our State Health Department is surely in process of becoming less of a hypothetic arm of the government.

Our Hospitality to Diseased Aliens.

The present immigration laws are idiotic, like some of the people who come in under them, or at least like many of the children of the people who pass through our friendly gates. Professor Ward, of Harvard, sees in their continuance the greatest factor in the downfall of the American race. Both he and Commissioner Williams of New York regard the further elimination of

incoming criminals and "criminaloids" and the exclusion of mental defectives as the two most important questions now confronting the nation. There is no sense whatever in sterilizing a few defectives in institutions if we keep on admitting the mentally and physically unfit. The relation of alien immigration to the eugenic problems that we are beginning to face is very direct. We may as well go on breeding our own defectives if we fail to settle this problem adequately and very soon. As Professor Ward says, "we are taking better care to see that a Hereford bull or a Southdown ewe, imported for breeding purposes, is sound and free from disease, than we take in seeing that the alien fathers and mothers of future American children are sound and strong and sane and fit."

The Conservation of Child Life.

During the year 1912 the general death rate of New York City was reduced from 15.12 per cent. to 14.11 per cent., or a little over 1 per cent. The rate for infants under 1 year was reduced from 111 to 105, or 6 per cent. In 1911 there were 15,053 deaths of babies under 1 year from all causes. In 1912 there were 14,289 similar deaths. The difference was 764. The number of births increased by 1,081. Had the deaths of babies increased in the same proportion there would have been 120 more baby funerals in 1912 instead of 764 less than in 1911, so that 884 infant lives were saved. These figures are by no means to be ascribed in great part to luck, weather conditions, etc., for the reduction in mortality has been chiefly in respect to those diarrheal, respiratory and contagious diseases that have been particularly campaigned against. But there is one potent factor which operates strongly in keeping up infant mortality which has not as yet been handled adequately, and that is ill health in prospective mothers. An attempt must be made to control in some degree prenatal and congenital factors entering into infant mortality.

The Eugenic Program.

Davenport ,of the Carnegie Institution's Station for Experimental Evolution at Cold Spring Harbor, questions whether a system by which philanthropists drain effective persons of their income until they cannot afford to have children, in order to secure funds to be spent in relieving imbecile parents of any expense of parentage, is a good thing for America. That is exactly the system we are living under, though ordinarily we dodge the issue involved. It is a fact that New York State spends one-fifth of its income on the care of the unfortunates in institutions. To this must be added the cost of operating criminal courts and fire departments. Rosanoff calculates that nearly one-third of our population carries insane strains. The unfit are rapidly increasing, due to the co-operation of modern medicine and philanthropy, which keep alive this class of the population and also facilitate their reproduction. What, asks Davenport, is the alternative? We cannot let the weak die? We must shelter and feed the poor, give happiness to the feeble-minded, protect the insane, cure the tuberculous and the cancerous. *We must keep them from reproducing their kind.*

Bathing Pools.

There is no doubt regarding the dangers residing in the pool bath as ordinarily used. The Superintendent of Public Buildings in New York City is planning for more of these baths. Ravenel believes that it is entirely possible to contract typhoid fever in baths of this type, but he has pointed out a practical means whereby we may divest them of danger. A preliminary soap and water shower scrub should be taken, and the water of the bath sterilized by the addition of hypochlorite of lime twice a week, in the proportion of one part of chlorine to a million parts of water. The hypochlorite frees the water from bacteria. This is a most important contribution to hygiene, making possible the extension of the pool bath system in New York and other cities, a system which is destined to become a very great factor in inculcating sanitary habits in a natural way, the habits in time becoming instincts. There can no longer be objection to the public bath on the score of uncleanliness and danger of infection, and Ravenel is to be congratulated on the part that he has played in putting this most important sanitary measure and delightful indulgence upon a safe basis.

Public Resentment.

A few days ago there appeared in the daily press reports from Roccagorga, Italy, by way of Rome, regarding a riot in which two persons were killed and four were shot, the riot having resulted from a demonstration on the part of the village people against a doctor. The soldiery had to be called out to defend the town hall; hence the shooting. The physician in question had become unpopular because of alleged neglect of poor patients in favor of those who would pay him large fees. This was resented so bitterly that a parade was organized to demonstrate the small favor in which he was held. The show of force at the town hall on the part of the soldiers angered the mob and it attacked them with sticks and stones, which occasioned a charge and the shooting of certain citizens. The physician who was the cause of the riot left the town.

At first thought certain humorous connotations are suggested. One can hardly conceive of such a happening in this country in the case of any commercial type of physician. No one here could possibly be made the recipient of such an odd form of flattery. The services of the Italian practitioner must have been held in higher esteem than are those of any American doctor.

But upon second thought it would appear that the resentment felt and expressed by this village mob is not any different in kind from the resentment entertained by our own public in respect to certain professional derelictions. The manner of degree of its expression differ only according to the temperament of the exploited. In Italy the simple and passionate folk attack an individual in primitive fashion. Here, the people's resentment lies against the profession, and is more subtly felt and expressed because of the high intelligence of the parties concerned. Moreover, the grievances of our public which have led to a lowering of the esteem in which the profession is held are themselves of a more subtle nature than those of Italian villagers.

The point which we seek to make is that the public puts a high estimate upon the profession and deplores any departure from what it considers should be professional ideals of service. Make no mistake about this. If we sin we must expect retribution. It is visited upon us in some form. No riots occur, and no blood is shed, but we suffer just the same. What sometimes seems to profit us, through practices which are ethically doubtful, is always found in the long run to be economically as well as morally disastrous. Aside from considerations of principle, professional honesty and square dealing constitute the best *policy* that we can follow. If we cannot always be guided by sincere altruism we should at least be governed by an enlightened selfishness. This line of reasoning may not meet with the entire approbation of critics, but it is devoid of hypocrisy, at any rate.

Medical Editorial Table

TRACHOMA A NATIONAL PROBLEM.

That trachoma has a wide prevalence in this country and is a menace elsewhere than in alien immigrants, is beginning to be realized by sanitarians. It is exceedingly common among the Alaskan and American Indians, ranking next among the latter in point of importance to tuberculosis. It is so common in the mountains of Kentucky as to constitute a serious sanitary problem. McMullen of the Public Health Service found 12½ per cent. of 4,000 persons whom he examined afflicted. The school children of this section show from 3 to 18 per cent. of cases. Entire families have the disease. Trachoma has been present for many years among these native born Americans. It is probably equally prevalent among the mountaineers of Tennessee, West Virginia, Virginia and North Carolina. Forty per cent. of these cases present corneal complications with many cases of pannus and ulceration, 10 per cent. have trichiasis, 25 per cent. show photophobia, and 25 per cent. suffer from defective vision, ranging from slight impairment to absolute blindness. These figures are based upon observations by J. A. Stucky. As showing the relation of trachoma to blindness it is enough to say that 67 per cent. of the cases of blindness in the Ohio State Institution for the blind is due to trachoma, and that 45 per cent. of the inmates in the Kentucky Institute for the Blind owe their blindness to trachoma. The maintenance of one blind person for life costs the State about $10,000. About half of the 64,000 registered blind persons in the United States are needlessly blind. Of the 6,200 cases in New York State in 1906. 1,084 were needlessly blind. Fewer cases of trachoma are now found among immigrants. In 1911, 2,504 cases were certified. The disease is a sanitary menace wherever it occurs, and the immigration law properly excludes those suffering from it. It is entitled to more serious consideration that it has hitherto received, as a factor tending seriously to decrease economic efficiency in its victims and indirectly in the local population among which it occurs. It is known to be communicable and is believed to be contagious. Its eradication from the United States will require knowledge and co-operation on the part of the people, and a systematic, long-continued campaign on the part of the public health authorities. The U. S. Public Health Service is now dealing with the problem in Alaska. Among the American Indians and the mountaineers of the South the Service is making a thorough study of the prevalence and best means of control of the disease. So far as possible the Service is also preventing its introduction by immigrants.—*Medical Record,* January 4, 1913.

The Present Trend of Medical Judgment in Regard to the Operative Treatment of Exophthalmic Goitre.

We know little of the pathology of this disease. On the clinical side of the question we are in a somewhat better established position. It has been maintained that the improvement following surgical interference may be the result of mental impression, but the rationale of the operation is based almost wholly upon a rather evident over-activity in the blood-supply of the thyroid gland and the clinical results following operation. Until somewhat lately quite a large proportion of the profession has not been willing to accept the latter part of this evidence as conclusive. Surgery has not been accepted very readily by the profession because the indications and the results have been more equivocal than in other diseases. The mortality has been high where judgment and skill have not been exercised, and successful results do not always include restoration to full normal health. But while the medical man has been learning that ordinary surgery is not good exophthalmic goitre surgery, the surgeon is learning how to recognize and avoid fatal errors. At present the confidence of medical men is being gradually restored, and they are again regarding surgery a lesser evil than the disease. Purely medicinal and hygienic treatment is not satisfactory, and cytolytic serums have not made good. While surgery alone is not the best treatment of the syndrome, the best cannot be effected without surgery until some better means is found. It is the surgeon's duty, and to the interest of the patient, the medical profession and himself, to foster by surgical results a growing confidence.—(*Interstate Medical Journal,* January, 1913.)

The Anesthetic Effects of the Intravenous Injection of Paraldehyde.

Experiments prove that paraldehyde, given intravenously, gives ideal anesthetic effects (*Annals of Surgery,* Jan., 1913). The patient passes into a perfectly natural sleep, respiration deepens, the pulse gets slower, and the color remains absolutely unaltered. Paraldehyde is a respiratory and cardiac stimulant, and is remarkably free from disagreeable after effects. There is a momentary depressant effect, but this transient influence can be overcome by dilution with an equal quantity of ether. Mix 5 to 15 Cc. of paraldehyde with the same amount of ether, and dissolve the mixture in 150 Cc. of cold 1 per cent. solution of sodium chloride in sterile distilled water, free from dead bacteria. The solution should be perfectly clear after shaking. It may be used cold or not exceeding 25° C. Introduce slowly into the veins the same as salvarsan, at the rate of 5 to 10 Cc. of the solution per minute. The following phenomena are noted: in five seconds the patient tastes paraldehyde; in ten seconds it can be detected in the breath; in twenty seconds a sensation of general warmth, with dizziness or a sense of floating, is felt; in thirty seconds consciousness begins to disappear; in forty seconds unconsciousness is complete; in sixty seconds unconsciousness is deep; in ninety seconds thre is no corneal reflex and anesthesia is complete. Up to this point 5 to 10 Cc. of the solution will have been administered. Elimination is carried on very rapidly through the lungs, and for a lasting effect the whole 150 Cc. of solution will have to be used. Recovery takes place in twenty minutes with no bad or after effects. Grave cardiac or pulmonary disease does not contraindicate it.—(*The Lancet-Clinic,* January, 1913.)

Stimulating Reparative Cell Growth.

A further step in the study of cellular life has been made by Doctor Carrel, who finds that the growth of the cell may be accelerated by introducing into the medium in which it lies certain tissue extracts. The tissue extracts were made from chick embryos from six to twenty days old and from the spleen, the kidney, and other organs of adult chickens and from specimens of Rous's chicken sarcoma. The experiments were made *in vitro,* since it was found impossible to control the conditions in the living animal. The cellular growth of fragments of the heart tissue of the chicken, immersed in a mixture of blood plasma, water, and extractive, was compared with the growth of similar fragments in plasma contain-

ing no tissue extract. It was found that under proper conditions as to temperature, etc., the extracts caused the cells to grow from three times to forty times as rapidly as did the cells immersed in the plasma alone. The extract from embryos was found most active, although the extracts from the spleen and from the Rous sarcoma were nearly as efficient in activating cell growth. Similar studies were made with the dog and with the rabbit. Apparently the results of these experiments point the way toward the acceleration of the reparative processes in wounds. It was observed, however, that the stimulant effect of the tissue extract is specific, being confined to like animals. The extract from a dog's spleen did not stimulate the growth of chicken or rabbit cells. In man we must evidently use extracts prepared from the tissues of human beings.—(*New York Medical Journal*, January 11, 1913.)

The Feeble-Minded Among Immigrants.

The detection of feeble-minded immigrants who may fail to become entirely self-supporting, later, perhaps, becoming public charges, is a distinct problem and requires of inspectors a different training from that which enables the too limited number of expert inspectors to detect the insane with great accuracy. Goddard has shown how the immigrant inspection service might be greatly improved in this respect. In experiments at Ellis Island it was found that the experts from the Vineland institution correctly picked seven-eighths of the number tested, while the regular inspectors picked out less than one-half. In another experiment eighty-three were picked out of twelve hundred and sixty immigrants who passed in line, while the physicians of the department selected eighteen. Southern Europe showed about 9 per cent. of defectives, while Northern Europe showed but 3.25 per cent. This in comparison with the estimated three or four defectives per thousand of the population in the United States shows an enormous proportion of defectives among the immigrants. In view of the steady and enormous stream of immigration to this country from foreign lands the conclusions to be drawn from this showing are so obvious that no extended statement of them need be made. The immigrant inspection service could be vastly improved by training of the inspectors in some institution for the feeble-minded for a year or two and the addition of a half dozen inspectors so trained. Then the immigration laws should be amended, or more strictly enforced in regard to deportation of defectives after their determination. The country must be relieved of an enormous and continuing burden of expense and responsibility, to say nothing of the deleterious effect of this defective stock on the entire social fabric.—(*J. A. M. A.*, January 18, 1913.)

Arsenic in Syphilis.

Prof. Edward Martin of the University of Pennsylvania, recommends neosalvarsan because of its ease in administrations, lesser toxicity, and at least equal efficiency. He does not believe in single doses of arsenical preparations, but holds that syphilis is often entirely curable by properly graduated courses of arsenic supplemented by mercury, as proven by the constantly increasing number of syphilitic reinfections published. He maintains that salvarsan and neosalvarsan have so firmly established their value that they should be adopted habitually as a part of the routine treatment of syphilis, the success in so far as radical cure is concerned being directly proportionate to the timeliness of their use.

BACTERIOLOGY.*

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PART VII. (*Concluded.*)

The Antagonism Between the Living Body and Micro-Organism.

The inborn or spontaneous resistance to an infectious disease existing in the body is termed its natural immunity. When, however, a body has contracted an infection and recovered, the resistance to that infectious disease which it has gained from the attack, is called its acquired immunity. The difficulty of developing in the tissues of a healthy body, which the majority of bacteria encounter, can be largely removed by lowering the general or local tone or vitality of the tissues. Among these causes of lowering tissue vitality may be mentioned—hunger, starvation, bad ventilation and heating, exhaustion from over-exertion, exposure to cold, the harmful effects of poisons, acute or chronic diseases, bad habits, drunkenness, etc. Local injuries, such as wounds and contusions, burns, etc., produce a favorable point of entrance for infection. Therefore, the best method of preventing infection is to raise the body resistance to its highest point.

Means of Increasing Resistance to Bacterial Invasion and of Removing Bacterial Infection.

First, by increasing or supporting the normal functions of the human body we increase its resistance to disease. For instance, by increasing the channels of elimination, that is, by increasing the natural secretions and excretions of the body we remove many poisons present, or poisons that the body naturally produces are prevented from becoming absorbed. Thus, by increasing the movement of the bowels we prevent the absorption of certain toxins that are produced there by bacteria normally present. If these toxins were absorbed the general resistance of the body would be reduced. In a similar manner, by increasing the excretions from the kidney, that is, the urine, or by increasing the action of the sweat glands we would cause a more complete throwing off of substances which if retained would act as poisons to the body and would thus lower its resistance. Therefore, to prevent infection or to throw it off when it is present in the body, see that the bowels are moving properly and that the kidneys and sweat glands are in healthy condition.

Secondly, infection can be prevented locally by keeping the body surface as clean as possible; that is, for instance, keeping the mouth clean, the teeth free from decay and the skin as free as possible from bacteria. When the bacteria have once begun developing locally they may, in some instances, be removed by cutting out the whole tissue in which they are growing. This is possible only in a few instances, such as, for example, in infection where the presence of tetanus bacilli is suspected the whole area of infection may either be cut out or destroyed by cauterization. Similarly in dog bites, where we suspect the possibility of hydrophobia, the tissues including the bites may be cut out or cauterized. Wounds, in general, may be cleansed and rendered sterile by antiseptic solutions, but after infection has taken place it is doubtful whether these antiseptic solutions have very much more direct influence than simple cleansing.

Thirdly, infection may be prevented or overcome by

*Abstract of a lecture before the nurses of Lebanon Hospital.

increasing the substances in the body which are normally produced to overcome disease. This leads us to a consideration of immunity. When bacteria have invaded the body conditions are produced which for a variable period and to a variable degree are deleterious to their further growth. Furthermore, substances may be produced in the body which neutralize the poisonous effects of the bacterial products.

We have practically five ways in which this specific immunity to bacteria and their products may be produced. First, by having the body pass through the disease which has been either naturally contracted or artificially produced. The immunity which follows may be slight, as we find in erysipelas and pneumonia; or present for a short period, as in diphtheria and typhoid fever, or prolonged, as after scarlet fever or smallpox. Secondly, we may inject bacteria which have been attenuated, that is weakened, by some means and thus produce a very slight attack of the disease. Vaccination is an example of this. We take the poison that produces cow pox and introduce that into a human being and produce a mild form of smallpox. The body is thus stimulated to make its own anti-poisons or anti-toxins to smallpox and thus immunity to smallpox results.

Third, we may inject bacteria into tissues in which they do not readily grow. The absorption of the bacteria with their products causes a mild chemical poisoning with a certain degree of immunity as a result. Fourth, if we inject the chemical constituents of the dead body of bacteria and the chemical products which they produce while growing on a culture media, we can establish a certain degree of immunity to infection by those bacteria.

Fifth, the blood serum of animals which have previously passed through a specific disease or have been inoculated with bacterial products contain substances which act as poisons to the bacteria which have caused the disease or act as substances which neutralize the poisons produced by these bacteria. The use of antitoxin in diphtheria is an illustration of this method of producing immunity. By repeatedly injecting the bacteria and their products into the horse the blood of the horse is made to contain a large amount of the substances which antagonize the bacilli of diphtheria and their products. These substances are called antitoxins. The serum of the horse, which contains this large amount of antitoxin is injected into a human being who has diphtheria. The antitoxin thus introduced neutralizes the toxin or poison produced by the diphtheria bacilli in the patient and also has a destructive action on the bacteria. If this antitoxin is introduced into a healthy person that person will become immune to an attack of diphtheria, that is, he will resist the onset of an attack of diphtheria.

The Meaning of Active and Passive Immunity.—When the immunity or resistance to disease is artificially produced by injecting the serum containing substances which destroy bacteria or their products, it is called passive immunity. When, however, the immunity is produced by allowing the body to pass through an attack of the disease, it is called active immunity. Passive immunity is at its height immediately after the injection of the serum and soon wears off.

Active immunity, however, is at its height a week or more after the bacteria have been introduced and then gradually decreases, lasting, however, a much longer time than passive immunity.

Anti-Bacterial Substances Found in the Blood.—Besides the antitoxins which may be found in the blood there are other substances which help the body in its battle with bacteria. The antitoxins act mostly by neutralizing the poisons produced by bacteria. Other substances, for instance, opsonins and agglutinins, act upon the bacteria themselves. Opsonins are substances very recently discovered. Opsonins act upon bacteria in such a way that they are easily taken up by leucocytes, or white blood cells and thus destroyed.

The agglutinins cause the motile bacteria to lose their power of motion, to clump together, and finally to disintegrate, that is, to be broken up. The action of the agglutinins are shown particularly in the Widal reaction in typhoid fever.

Surgery

USE AND ABUSE OF CERTAIN DRUGS IN THE TREATMENT OF SHOCK.

Edgar A. Vander Veer and J. L. Bendell, of Albany (*American Journal of Surgery*, October, 1912), discuss the treatment of shock in its relation to emergency surgery. They divide shock into two general types. First, shock due to loss of blood primarily, as in crushing injuries of legs and arms, where, through rupture of large vessels, the patient becomes exsanguinated. Second, cases of severe trauma without great loss of blood, producing a condition of shock *per se* with lowering of vasomotor tone. In all cases the administration of normal salt solution is a matter of routine. Yet havoc may be worked with an already crippled heart if loss of vasomotor tone is not dependent upon vascular depletion. Normal salt solution under certain circumstances may therefore be dispensed with. The initial dose is 750 Cc., given slowly at the junction of the second right costal cartilage with the rib, having the needle point slightly downward toward the axilla. The solution should not be cooler than body temperature. It may also be given after the drop by drop proctoclysis method of Murphy, or intravenously. Strychnia has been found of little avail, in accordance with the experiments of Crile. Digitalis has also been found well-nigh useless. The sheet anchors are camphor, adrenalin chloride and morphine. The camphor is used in the form of sterilized camphorated oil, given in doses of 15 to 20 minims and repeated if necessary, where suddenly impending collapse calls for a rapidly diffusable cardiac stimulant. It must not be forgotten, however, that camphor is a renal irritant when used over a considerable period of time, and that the oily constituents of camphorated oil may not be absorbed and cause abscess. Adrenalin chloride raises vascular tone in a way almost equal to the effects of morphine as an anodyne. The dose is 15 minims every 15 minutes for four or five repetitions. Continued use produces arteriosclerosis and it is harmful in cases where there is a predisposition to pneumonia and pulmonary edema. Yet in extreme cases ten or fifteen minims may be given every hour or two after the first four or five initial administrations. Nitroglycerin does harm because of its vaso-dilator qualities. Morphine, with its rapid and wonderful power, should be used more frequently than it is. Many a life has been saved and many a one lost because the physician either did or did not administer morphine in sufficient dosage to tide his patient over the shock and nervous excitement.

Iodine Sterilization in Its Application to General Practice.

F. A. Long, of Madison, Nebraska (*Western Medical Review*, October, 1912), writes of the newer uses of

iodine. He points out that the antiseptic properties of this drug were recognized very early, but that its special use in surgical technique dates back to 1908, when Grossich announced that simple painting of the skin without any previous preparation fulfilled all requirements. Tests have apparently shown that the fresh tincture will sterilize the deeper layers of the skin in about seven minutes and that it does not impair the vitality of the tissues. The ordinary tincture is unstable and develops hydriodic acid, which is very irritating. The addition of potassium iodide makes it stable, but it is better to make the tincture fresh when needed. Forty grains of iodine to the ounce of alcohol makes approximately a 10 per cent. tincture. This should be used in the treatment of all emergency wounds and skin infections. If the surplus is carefully wiped off so that the surface is a dry brown no symptoms of poisoning will supervene. The directions of Reclus should be followed. With a small gauze sponge held in the grasp of forceps, a part of the same impregnated with the tincture of iodine, every recess of the wound is coated over, every crevice being sought out, at the expense of enlarging the wound if necessary, so that not a millimeter of surface remains untouched. Next the surrounding skin is treated the same way. Preliminary soap and water actually interfere with the best results. Where shaving is necessary, dry shaving must be done. The wound should first be dried with sterile gauze and the iodine should not be slopped over it and allowed to trickle down. At the conclusion of the operation any excess may be washed away with alcohol. Great care must be taken to absorb or wash away any excess of iodine from cracks and crevices and folds. Dress with simple gauze and a light cotton covering. Remove dressing in 24 hours and again apply iodine to all recesses of the wound, and, after drying, again apply the gauze and cotton dressing. Repeat this daily until all oozing ceases, after which dressing is changed every three to five days. If secretions collect under desquamating skin or under crusts remove such skin or crusts and again apply iodine to the surface.

Treatment of Simple Fractures.

Cathcart (*Edinburgh Medical Journal*, August, 1912) remarks that in the treatment of simple fractures three methods have their advocates—the old form of rigid immobilization, the massage and early movement of Lucas Championniere, and the immediate operation as advocated by Arbuthnot Lane. The following fields of application for the different methods are:

1. The rigid immobilization method may now be modified since the massage and movement method has shown that some movement is no obstacle, but rather a help towards union. It is seldom necessary to secure the joint above and the joint below the fracture unless for comfort, and the limb may be massaged and the joints moved as often as convenient. This modified immobilization method gives good functional results in children in most fractures of the shafts and in adults in the same fractures (shaft of femur excepted) if there is no great displacement of the fragments nor severe laceration of soft parts. In fractures of the femur in adults, however, prolonged fixation is apt to lead to trouble in the knee, as will be explained.

2. Massage and early movement give more rapid results than modified immobilization in the classes of case just mentioned, although the final results may not be much better. It is also the method of choice for fractures near or involving joints, such as fractures of the olecranon, and many fractures involving the elbow in children, so long as they do not require immediate operation (see next paragraph), and in fractures of shafts with much laceration of soft parts and irregularity at the seat of fracture, so long as there is not much angular or axial deformity nor necessity for complete restoration of length of limb as in the lower limb of men in the public services. It is also to be preferred to the modified immobilization method in fractures suitable for operation which is contra-indicated by the patient's age or constitution, to local sepsis or other cause.

3. Immediate operation when reliable technique is available is the method of choice in transverse fracture of the patella in healthy adults, in joint fractures when the fragments mechanically hinder movement, when the important muscular attachments are torn off and cannot be approximated, when a nerve is involved or soft parts prevent the fragments from coming into contact, when angular and axial deformity cannot be restored by manipulation or posture, especially in the lower limb or when the occupation necessitates walking without a limp, as in the army or police force.

Sometimes the swelling after an injury makes it difficult to diagnose the exact seat of the fracture and the position of the fragments. In doubtful cases a skiagram should be taken as soon as possible; failing this, a careful examination under chloroform is advisable with accurate comparison of the injured with the sound limb by measurement, after the best possible restitution.

Spontaneous Fracture as an Initial or Early Symptom of Tabes Dorsalis.

Henry L. Taylor, of New York (*New York State Journal of Medicine*, October, 1912), calls attention to the comparative frequency of spontaneous fracture in individuals suffering from tabes dorsalis, and its importance as an initial or early symptom of that distressing malady. He reports nine cases, and the article is illustrated with skiagrams. These cases have been met with during the past three years by the author, sufficient indication that spontaneous fracture in tabetics cannot be very rare. The fact that in seven out of the nine cases fracture occurred before there was any disturbance of the ordinary gait is sufficient reason for calling attention to its importance as an early symptom of diagnostic importance. This type of fracture is practically painless and may be produced by such activities as are, or may be, practiced daily without harm by ordinary individuals. These fractures are slow in healing, union finally taking place, and the callus is excessive. In the end a useful limb is secured. Symptoms preceding fracture may be irregular, sharp, shooting pains in the trunk or limbs, or both, ophthalmoplegia, absent knee jerks, pupillary symptoms and Romberg's sign. In two of Taylor's cases the ataxic gait was present for years before the fracture. The relation of Charcot joints to tabes seems to be similar to that of spontaneous fracture. It seems clear that: 1. Spontaneous fractures are not infrequently an initial or early symptom of tabes. 2. Such fractures occur frequently before there is any disturbance of gait. 3. All adults who have had painless or spontaneous fractures should be examined for tabes. 4. Tabetics should avoid sudden or jerky movements, especially heavy lifting, and twisting movements. 5. Charcot joints may also be an initial or early symptom of tabes. 6. Persistent attacks of shooting pains in the trunk or limbs should always lead to an examination for tabes. 7. The term tabes dorsalis should be preferred to the misleading "locomotor ataxia," since an ataxic gait is not infrequently one of the latest symptoms to appear.

An Improved Method of Treating Leg Ulcers.

G. A. Neuffer, of Abbeville, S. C., describes a method (*International Jour. Surg.*, November, 1912) of treating and curing ulcers of the leg which has several advantages over any other and which has been uniformly successful in his hands. Scrub the leg thoroughly with warm water and a liquid antiseptic soap, using an ordinary surgical brush as long as the patient will permit, or until it begins to bleed; then rinse with a warm 1 to 1,000 aqueous carbolic acid solution. Then dry and apply a 60-grain-to-the-ounce solution of nitrate of silver, using just enough to make the ulcer turn white. Next cover with a smooth pad of sterilized gauze, about six thicknesses. Now, with a flat three or four-inch paint brush, cover the leg from the base of the toes up to the knee with a good coating of Unna's paste, being sure to apply it thoroughly over the gauze pad as well as over the rest of the limb. Over this apply a three-inch gauze bandage, then another coat of the paste, and bring the bandage down from the knee back to the base of the toes. This dressing must be changed every week or ten days. It may have to be done oftener, according to the amount of discomfort or discharge. Make the intervals as long as possible. After the ulcer is cured an elastic stocking must be worn to prevent a return. This method does away with the necessity of the recumbent position. Usually eight weeks are required to effect a cure. When cool the dressing is solid, and therefore it must be heated before applying. The formula for Unna's paste is as follows: Gelatin, 4 parts; water, 10 parts; glycerin, 10 parts; zinc oxide, 4 parts. The gelatine and cold water are put in a basin over a fire and a solution made, then the glycerin and zinc oxide are added, with constant stirring.

Treatment of Burns.

R. J. Griffin, of Moundville, Ala., writes a practical paper on burns. (*International Jour. Surg.*, November, 1912.) Many patients die from shock in extensive burns, especially where it lasts from twenty-four to forty-eight hours. Heat must be applied externally to all parts of the body, since the large abdominal veins are filled with blood in shock. Cardiac stimulants must be given—morphin and atropin hypodermatically. The morphin also controls the pain. Adrenalin chloride, strychnia, nitroglycerin and camphor are useful. The blood pressure must be raised and maintained, while at the same time overstimulation must be avoided. In burns of the first degree a non-alcoholic solution of picric acid, one-half to one grain to the ounce of water, relieves the pain. Cold cream or carbolized vaseline may suffice. In burns of the second degree there will be blisters, but no slough of the true skin. The indications are now to relieve pain and prevent infection. Picric acid may be used, but will cause pain in some cases. The parts are first washed in a normal salt solution; if there is much pus add some peroxide of hydrogen to the saline. Then apply subnitrate of bismuth, one part, and powdered charcoal 10 parts. Leave the burn open to the air. In burns of the third degree the sloughs may take two weeks or more to separate; they should be cut away as soon as possible after they become loose, but not before. In large areas the sloughs may have to be incised, in order to facilitate the escape of pus and secretions. Frequent changes of dressings are to be avoided, unless they become saturated with pus and serum. All very large surfaces, after the removal of all sloughs, should be skin-grafted, if there is a healthy granulating area. Be on the alert for symptoms of infection. The kidneys must be carefully watched, as a renal complication is apt to be fatal. Low specific gravity and albumin are to be looked out for. It is a good plan to give twice a week small doses of the mild chloride of mercury, followed by salines, also urotropin twice daily as a prophylactic and to help the kidneys to throw off as much solids as possible.

Further Observations on the Treatment of Human Cancer with Intravenous Injections of Colloidal Copper.

Leo Loeb and his St. Louis colleagues report further observations upon cases treated intravenously with colloidal copper, and after detailing a number of new cases and commenting upon the condition of those in their first series, remark in their summary that the histories confirm essentially their former conclusions. Rapidly growing tumors, which lead to extensive metastases in the internal organs, and those in which cachexia is pronounced, cannot be benefited by the treatment. In the large majority of all other cases which must be considered inoperable, the continued intravenous injections of colloidal copper lead to a gradual retrogression of the tumor; and, in the majority of cases, there is noticeable a marked diminution in the pain from which the patients suffer. In a number of cases there is a gradual decrease in the effect of the injections. This slowing became more pronounced the further Loeb's work progressed, and in the majority of his older cases he doubts whether any progress has been made within the last few weeks. In one case in which there was marked retrogression for a time a further extension of the growth has apparently occurred. This gradual diminution in the efficiency of the intravenous injections has not been apparent in every case, however. In fact, in a number of cases the healing processes became perhaps more marked after the twentieth injection had been given. It may be said that we now have the means at hand to cause a gradual, although only partial, retrogression of the large majority of inoperable cancers, provided they have not yet progressed to the last stage of the disease. But the action of the intravenous injections of colloidal copper is too slow to render it probable that in the large majority of cases a cure will be accomplished by this mode of treatment. And it is still too early to make any definite statement as to the ultimate fate of the patients who are at present under treatment. The work has shown several interesting things. Thus the prolifererative energy of the connective tissue is relatively increased. Also the degree of response to the treatment varies somewhat in different cases; while some cases show a very strong reaction, in others it is less marked. Finally, the majority of human carcinomata are more amenable to the influence of colloidal copper than is mouse cancer. For corresponding effects, cancerous mice require far larger doses of colloidal copper, in proportion to body weight, than do patients. In fact, Loeb has not been able to cause a marked retrogression of mouse cancer by the injections of colloidal copper. A temporary inhibition of growth represents the maximum effect on mouse cancer. This fact gives hope that something will yet be found which will lead to a more rapid retrogression of cancer than has been accomplished so far through colloidal solutions of copper, with perhaps resultant cure. On the other hand, the general reaction of human beings to some of those substances which cause a retrogression of animal tumors is much more marked than the reaction in mice. The lethal dose is, therefore, probably very much lower in the case of man.—(*Interstate Medical Journal*, January, 1913.)

Public Health

Fundamental Principles of Society.

(1) "The commonwealth is greater than any individual in it. Hence the rights of society over the life, the reproduction, the behavior and the traits of the individuals that compose it are, in all matters that concern the life and proper progress of society, limitless, and society may take life, may sterilize, may segregate so as to prevent marriage, may restrict liberty in a hundred ways."—*Davenport.*

(2) The feeble minded, the syphilitic, the consumptive and the person afflicted with gonorrhoea are *unfit* to propagate a race creditably to any nation on earth.

(3) The duty of society to itself warrants the application of prevention of marriage, segregation or sterilization to these persons properly classed as "unfit."

These are three self-evident, incontrovertible principles. The proper method of dealing with these principles is not so clearly evident, and calls for careful consideration. Sterilization of certain classes of feeble minded and criminals has been authorized by law in eight states. In none has the principle been applied systematically and generally enough to give dependable data upon which to base a conclusion.

The present law of Michigan, Act 136, public acts 1905, provides that "no insane person, idiot, or person who has been afflicted with syphilis or gonorrhoea and has not been cured of same, shall be capable of contracting marriage. Any person who has been afflicted with syphilis or gonorrhea and has not been cured of the same, who shall marry shall be deemed guilty of a felony and upon conviction thereof in any court of competent jurisdiction, shall be punished by a fine of not less than five hundred dollars nor more than one thousand dollars, or by imprisonment in the State Prison at Jackson not more than five years or by both, such fine and imprisonment in the discretion of the court." The same act further provides that "no person who has been confined in any public institution or asylum as an epileptic, feeble minded, imbecile or insane patient shall be capable of contracting marriage" without having filed certificates from two regularly licensed physicians of the State that such person has been cured.

This law sounds well and carries good intentions. *Present conditions do not verify the effectiveness of the law.* Apparently it is not enough to depend upon the statements of the applicants for marriage license. More than that, how many county clerks, before issuing a marriage license, ever ask the applicant if he has or has had a venereal disease or if he has ever been confined as an epileptic, feeble minded, imbecile or insane person?

The question of physical condition for marriage should be controlled not by the applicant but by some authority granted by the State. If it is worth while to support our federal meat laws by inspections, it is certainly worth while to control our marriage laws by the judgment of competent persons so authorized.—*Public Health of Michigan.*

Immunization Against Typhoid Fever.

Immunization against typhoid fever has become established as a prophylactic measure of proved efficiency. Feeling that its wider use, under proper precautions, is called for, the Board of Health of the City of New York has authorized the performance of immunization against typhoid fever, by its inspectors, under conditions similar to those governing the free administration of diphtheria antitoxin. Inoculations are made at the homes of applicants or at the central office of the department, or the cultures are furnished free to physicians for their own use.

As at least 10 per cent. of the cases of typhoid fever occurring in New York City are thought to be due to contact, immediate or indirect with a preceding case in the same locality, and not to infected water or milk, it is believed that widespread immunization of the members of all such families will sensibly reduce the occurrence of typhoid fever in the City.

Ice as a Possible Epidemiological Factor.

In a recent public address on the "Non-Relation of Natural Ice to Typhoid Fever and Dysentery," Dr. H. W. Hill, late of the Minnesota State Board of Health, said:

The quantitative relationships of ice to other forms of possible typhoid conveyors has not been sufficiently emphasized. I believe that I first pointed out some years ago, that the total annual ice supply of a given community does not usually exceed the equivalent of one or two days water supply for the same community —and hence that if the same proportion of ice were used for drinking purposes as obtains in the case of water (an assumption I think in excess of the truth) the water used for drinking purposes in the form of ice would form but about one-third to two-thirds of one per cent. of the water used for drinking purposes in the form of water. Hence, in a community afflicted with a typhoid-polluted water supply, the ice could not be counted on to supply more than one-third to two-thirds of one per cent. of the total water-borne typhoid cases —even were it arranged to have all the ice taken from the same contaminated source and even if it were possible to have all the ice so taken used without any of those changes constituting the natural purification of ice of which we are all aware. Allowing for these inevitable changes, even artificial ice, frozen from such a water supply and used within a day or two of freezing, could not, on account of the purification obtained before, during, and after freezing, be held responsible for more than 1-15 to 1-30 of 1 per cent. of the total waterborne typhoid. How much less can natural ice be held accountable, the self-purification of which is much greater because of the nature of natural freezing, the conditions under which it occurs and the relatively prolonged action of the freezing temperature. In Philadelphia, a polluted water supply is held to have furnished an average of 4,000 to 6,000 cases per year, for forty years. Had this same typhoid-polluted water furnished the sole ice supply of Philadelphia, and supposing that ice did not purify itself at all between freezing and actual use, only 20 to 40 cases annually could logically be attributed to this source. Allowing for the known purification which natural ice undergoes it would be inexcusable for any epidemiologist to attribute to the natural ice even if all of it were taken from the same source as the water, an average of more than 3-10 case per year or 1 case in 3 years.

Medical Inspection in Schools.

Medical inspection in schools, properly performed, is one of the surest and best methods of disease prevention. For that reason the inspection must be thorough, efficient and intelligent.

Discussing this subject before the recent meeting of the National Education Association, F. D. Dresslar, the Bureau of Education's specialist in school hygiene, stated that the chief objects of medical inspection must include the following points:

1. It ought to serve as an efficient means of preventing the spread of contagious diseases, particularly those to which school children are peculiarly susceptible. This will necessitate a careful examination of all children, especially at the beginning of the school terms, in order both to exclude children who are suffering from contagious or parasitic diseases and those "carriers" who are a menace to others, even though they themselves show no decided effects of the diseases they are capable of disseminating.

2. Medical inspection ought to emphasize in a decided way the especial significance of hygienic conditions in schools. It seems more than foolish to shut up our well children in unventilated and improperly lighted schoolrooms, furnish them no playgrounds, compel them to live a life not in accord with the laws of physical development, and then when they become anemic, nearsighted, and defective make a great stir about special classes for defectives and spend in building special schools money better spent in keeping children well. We must learn that it is far more important to furnish conditions which promote the health and development of well children than it is to make special efforts to care for those who are sick or defective, especially where these defects have been largely induced through neglect.

3. Health officers must know more about education, more about the hygiene of teaching, more about the normal demands of child life; they must possess more ability to work with teachers and the people for the general welfare of the community. (A large majority of physicians, those who would not hesitate to undertake the work of supervising the health interests centered in our public schools, are wholly unfit for the place, because they know next to nothing of the ideals and methods of modern education, and they are ignorant of their own ignorance.) The best results can not obtain under such conditions.

4. We need health officers whose chief delight is in finding and developing beautiful cases of physical perfection rather than in finding some obscure and rare disease.

We need doctors of health, who will be more delighted in exhibiting a large list of healthy, well-developed children than a long list of those who are physically defective and diseased. We need a combination of the Athenian worship of physical perfection, the enthusiasm and skill of the modern bacteriologist, and the spirit of the teacher whose face is turned toward better things. We need health officers whose philosophy is based on the gospel of physical vigor, on the sanctity of personal purity and the godliness of clean living.

Legal Medicine

Proposed Amendment to Medical Act.

A bill is about to be presented to the legislature of New York, which will amend the public health law, relative to medical licenses. It has the backing of men influential in educational circles and if it becomes a law, will materially strengthen the medical practice act.

According to its terms, "unprofessional conduct" will include the following acts on the part of the practitioner: (a) Advertising in his own name or that of another person, firm, association or corporation, holding out to cure diseases or defects of the sexual organs, or being employed by anyone so advertising. (b) Announcing professional service without compensation or the acceptance of fees in consideration of the assurance that an incurable disease may be permanently cured.

(c) Wilfully betraying a professional secret.

(d) Habitual drunkenness or addiction to drugs.

(e) Employment of solicitors for securing patients, or division of fees or promise of division of fees, or the payment of money or any valuable thing for service in securing patients.

(f) Any action not consonant with good morals.

(g) Any other act which is inimical to the good name and character of the medical profession or which tends to impair public confidence in the members of the profession, in the judgment of the Board of Regents.

Another section reads that no person shall practise medicine who has ever been convicted of a felony by any court or whose authority to practise is suspended or revoked by the Regents. The conviction of a felony shall include the conviction of any offense which, if committed within the State of New York, would constitute a felony. Absolute pardon by the chief executive of any of the states or of the United States granted to any practitioner of medicine for the commission of any felony or crime, which under New York laws would constitute a felony, shall not restore to such person the right to practice medicine or any privileges under this article.

An amendment to the section on licenses provides that after the applicant has successfully passed the necessary examinations, the Regents shall issue a license, but if the Regents deem further inquiry desirable, they may withhold any such license; and they may revoke and cancel the same, if, before its actual delivery to the licensee, it is deemed he is not properly entitled thereto, or which if the license had been delivered would justify its revocation.

An amendment to the section on registry makes it possible for the Regents to revoke the license of a practitioner, annul his registration or both or suspend him from the practice of his profession for any length of time if he (a) is guilty of any fraud or deceit or crime or misdemeanor, or if he was admitted to practice by deceit, (b) is an habitual drunkard or drug addict, or is guilty of unprofessional conduct, (c) procures or performs any criminal abortion as the same is defined under the penal law or if he violates any of the provisions of the penal law, (d) has been adjudged insane by a court or other tribunal of competent jurisdiction and has been committed to an institution for the care of the insane.

These amendments, if they become part of the law of the State will go far toward maintaining a higher standard for physicians and will enable the profession through the Board of Regents, to purge itself of its unworthy members.

Chiropractor Sentenced.

Otto Scholtz, a chiropractor, whose case was described in the February issue of the MEDICAL TIMES, was found guilty of practising medicine without a license by the full bench in the Court of Special Sessions of New York and sentenced to $50 or ten days in the Tombs.

He claimed that as he acted under the direction of a licensed physician he was not subject to the medical practice law.

Scholtz's attorney, representing the Chiropractic Association of America, appealed the case and says that he will carry it to the highest court if he is defeated in the lower tribunals.

Gastric Diseases

A New Method of Treatment of Ulcer of the Stomach.

J. W. Weinstein, of New York (*J. A. M. A.*, September 28, 1912), reports invariably good results from his method of treating chronic ulcers of the stomach. All the cases were of long standing, dating back as far as fifteen years, with treatment at the hands of a large number of practitioners. Fourteen patients were entirely cured. The following diet is prescribed: white bread, zwieback, toast, soda crackers, corn flakes, farina, cream of wheat, mashed potatoes, soft boiled eggs, cream cheese, butter, sugar, boiled fish, raw or stewed oysters, baked apples, water, milk, buttermilk, matzoon, prepared buttermilk, vichy, weak tea, cocoa. Patients must not take any other food and must eat slowly and chew the food well. Meats and broths are excluded, for, as shown by Pawlow, of all foodstuffs, meat extractives are the greatest stimulants of gastric secretion. The diet must be adhered to for four weeks, then easily digested meats and soups are added—broiled steak, broiled lamb chops, boiled beef and chicken. No food should be fried. When soups are begun they must not contain any vegetables, unless, perhaps, carefully strained. Vegetable cellulose is a great irritant. To cure the ulcer bismuth is used. One dram of the subcarbonate is given once a day in the morning on an empty stomach, in a tumbler of buttermilk thoroughly stirred up. The patient must not have anything afterward for an hour. Radiographs show that it spreads all over the stomach. Castor oil must be given once a week, in order to offset the cumulative tendency of the bismuth within the intestinal tract. The flow of hydrochloric acid is checked by atropin sulphate, in doses of 1/150 to 1/150 grn. three times a day ten minutes before meals, or extract of belladonna in doses of one-fifth grn. In addition magnesium oxid in doses varying from 5 grn. to 1 dram is given, the average dose being one-half dram. It is given one or two hours after meals in about two ounces of water. It not only helps to neutralize the acidity but regulates the bowels, an essential part of the treatment. Olive oil will also diminish the secretion of hydrochloric acid. It may be used in place of the belladonna and alkali. One or two tablespoonfuls ten minutes before meals will, as shown by Pawlow, act in this way, and, moreover, the oil is laxative. If there is any stasis of food, lavage seven hours after the meal must be practiced once or twice a week. Bicarbonate of soda should be added to the wash-water. The last step in the treatment is the application of wet compresses to the stomach every night. The patient sleeps through the night with it and removes it in the morning. This course of treatment is carried out for eight weeks, the patient being seen about once a week. Improvement is so marked from the start that these patients are apt to transgress the dietetic rules. Candy is a particularly pernicious thing to use, on account of the hyper-acidity produced by it. About the fourth or fifth week the dose of bismuth is diminished to 3 Gm., then to 2 Gm. At the end of eight weeks it is stopped altogether, and the patient is discharged as cured with the following dietetic rules to be kept up for at least six months: Avoid fried foods, fatty meat, sausage, delicatessen, sardines, caviar, cabbage, canned foods, the tough parts, veins, sinews and skin of meats and poultry; the stones, pits, seeds and core of fruits and berries; liquor, radishes, pickles, smoked salmon, herring, the bones of fish, highly seasoned foods.

A Practical Discussion of Some of the Views Concerning Hyperacidity, Ulcer and Gastric Cancer.

R. M. Rankin, of Covington, Kentucky, prefaces his paper (*Am. Jour. Surg.*, November, 1912) by explainin gthat by hyperacidity he means hyperchlorhydria. The excessive secretion of hydrochloric acid is due to the abuse of such foods and articles of diet as meat, meat juices, meat extracts, salt, sharp condiments, coffee, tea, spices, etc., and to pernicious habits, such as rapid eating, over-eating, the excessive use of tobacco, alcohol, etc. Lack of exercise, disturbance of mental tranquillity and other neurotic influences may be considered as auxiliary causative factors. Surgery has proved that oftentimes the gall-bladder or the appendix is the site of the lesion, and the stomach the place of manifestation of the symptoms complained of by many patients. The vast majority of gastric cancers have been proved within the last ten years to have "developed on an ulcer base," the ulcer in these cases being denominated the "pre-cancer stage." Surgery has taught us, too, that the later the ulcer symptoms occur after the ingestion of food, the greater the probability of the ulcer being duodenal. The profession rivets its attention too much upon ulcer and cancer, however—logically the effects, and diverts it from hyperacidity—admittedly the cause, or at least the most potent factor in the development of the ulcer and indirectly of the cancer. Hyperacidity, ulcer, cancer, is the order of etiological relationship of the trio. Therefore hyperacidity is the greatest and most important of the three. It is most important because it is the strongest and most potent port to be attacked in the battle against ulcer and cancer of the stomach and duodenum.

Variations in Gastric Ulcer.

Cheney (*Interstate Medical Journal*, October, 1912), in a discussion of this topic says:

(1) There is no absolutely certain clinical history of ulcer: for the symptoms vary widely in different cases and at different times in the same case.

(2) Nocturnal pain, arousing from sleep, does not always mean duodenal ulcer, as so great an authority as Moynihan would have us believe; for, as proved by the cases reported, it may occur as well when the ulcer is gastric and far from the pylorus.

(3) Hematemesis may never occur in the course of a chronic gastric ulcer, and its absence from the history is no bar to the diagnosis.

(4) Vomiting of any kind may never take place throughout the entire course of the ulcer history.

(5) Pain is the one symptom that most unfailingly presents itself at some time and is the most constant complaint in most cases; but this pain varies greatly in severity in different cases and at different times; also as regards the site at which it is felt and the time after eating at which it occurs.

(6) It is always important, in estimating the meaning of a gastric history resembling that of ulcer, to remember the possibility of reflex gastric symptoms from chronic appendicitis, or chronic cholecystitis, or intestinal parasites such as tapeworm, as well as the gastric crises of locomotor ataxia.

A careful history should be taken in every case of chronic gastritis, ulcer of the stomach and tumors of the stomach with special reference to the possibility of lues. If a definite luetic history is obtained, and especially in the presence of a positive Wassermann or Noguchi reaction, antiluetic treatment may well be instituted.

Genito-Urinary Diseases

Urethral Drainage in the Treatment of Chronic Urethritis.

G. H. Persson, of Mount Clemens, Mich., describes at length Nature's efforts to remove infection from the urethral canal and how the surgeon may successfully supplement such efforts (*N. Y. Med. Jour.*, November 30, 1912). Drainage is indicated in all conditions where there is an accumulation of pus and the urethra should form no exception to this universal surgical rule. Drainage of the urethra has been attempted a number of times but the results have been indifferent and the methods devised have not stood the test of time or usage very well. Persson failed at first, but has finally elaborated a technique which gives excellent results. A sterile preparation, the principal constituents of which are gelatin and whey, is introduced into the urethral canal, where it acts as a sedative, lubricant and nutritive medium for the lactic acid germs which are afterward implanted. After this preparation, drainage cords are inserted daily and allowed to remain from three to eight hours. A bacterial war is thus instituted and the dead anl disabled gonococci and their bacterial cohorts are removed by route of the drainage cord, leaving an unrestricted field for the activity of the opposing forces. The older method of injecting suspensions of lactic acid organisms, as described by the author in the *Medical Record* for September 24, 1910, did not succeed. The use of a culture medium seems to meet every indication and the results have been gratifying. The author's conclusions are as follows: 1. Suitable drainage in the urethral canal is indicated in the treatment of urethritis, because it provides for rapid elimination of pathogenic bacteria and their products. 2. Sterile drainage is of great value as a diagnostic means to determine the presence of gonococci in doubtful cases. 3. Antiseptic drainage serves the same purpose in the urethral canal as applications of gauze in surgical treatment of wounds. 4. Drainage material used in the urethra must be absorbent in character, without which property it is useless. 5. Lactic ferments are indicated in the treatment of chronic urethritis, because these bacteria when properly used have germicidal effects on the offending organism in the urethra. 6. Certain lactic ferments produce under favorable conditions bacterial products which increase the activity of cells with which they are brought in contact, thus promoting the absorption in this instance of the perigranular infiltration that is the characteristic pathological factor in chronic urethritis. 7. The requirements necessary for success are, first, a proper method of application by which drainage may be introduced without discomfort to the patient, and, second, the use of an emollient substance which acts as a lubricant without making the drain nonabsorbent and in which the dessicated ferment finds a favorable medium for development. 8. This medium must be prepared with the aim in view of preventing the natural death of the ferment by neutralizing the excess of lactic acid when this reaches a point where it acts destructively to the organisms which produce it. 9. This medium must also contain elements in the presence of which the lactid acid organism produces a large amount of enzymes, or that bacterial product which causes increased local cellular activity and induces formation of bacteriotropic substances. 10. These requirements are not difficult to fulfill, and we are rewarded for our labors with much gratifying results in an unexpected percentage of cases.

The Diagnosis of Nephritis.

William Engelbach, of St. Louis (*Jour. Mo. State Med. Assn.*, October, 1912), scouts the prevailing law that urinary findings indicate more or less definite structural change or abnormal function of the kidney and the belief that urine free from abnormal elements means that there is no renal disease. That these estimations do not hold has become very well established. Glomerulonephritis, one of the most serious forms of the parenchymatous types, is not accompanied by albuminuria. About fifty per cent. of the contracted, interstitial or arteriosclerotic kidneys do not present classical findings. Special tests of cases in which marked urinary findings have apparently indicated considerable lesion and definite insufficiency have often proved that the function of the kidneys is not really much diminished, whereas a very marked decrease in the eliminating power of these organs may be accompanied by a practically normal urine. Secondary changes in other organs are apt to receive attention as primary conditions. Thus the relative mitral insufficiency of parenchymatous nephritis may be mistaken for a primary lesion and the kidney practically overlooked, or thought to be merely the seat of a passive congestion incidental to the heart disease. The changing of a parenchymatous nephritis into a contracted kidney may make the urine appear almost normal and the mitral insufficiency accompanying it dominates the clinical picture. Pericarditis and myocarditis may be regarded as primary when they are really secondary; indeed, the latter may be muscular insufficiency and not myocarditis at all. Arteriosclerosis may also not be properly associated with kidney lesions, of which it may be only an element. Many of the so-called cardiac and bronchial asthmas are really nephritic. The contracted kidney accounts for these. A great majority of these cases give a history of sudden attacks of dyspnea occurring after a number of hours of quiet sleep, though in the later stages of kidney disease the other type of dyspnea, that occurring after exertion, makes its appearance owing to the secondary muscular insufficiency of cardiac asthma due to the contracted kidneys. Gastro-intestinal symptoms simulating carcinoma and abdominal and hepatic tumors (relative insufficiency of the tricuspid valve) are not uncommon and occasion many diagnostic mistakes. The urine in these cases may completely mislead the practitioner. The urine analysis should not be taken alone as a criterion for either the pathologic condition or function of the kidneys. Changes in the cardiovascular system, hypertrophy of the left ventricle, mitral regurgitation, accentuated second aortic tone, pericarditis, etc., should always lead to a further investigation concerning a kidney lesion. Systolic blood-pressure above 160 mg. is usually indicative of kidney lesion even though the urine be normal. Albuminuric retinitis is positive evidence, but is not usually present. Vertigo and headache should arouse suspicion, when persistent and not amenable to treatment, even though the urine is negative. The phenolsulphonepthalein functional test of Rowntree and Geraghty has proved of great aid in diagnosis.

Proctoclysis as a Curative and Prophylactic Agent in Primary and Secondary Acute Nephritis in Children.

H. Lowenburg, of Philadelphia, finds that his clinical experience bears out the experimental data of Martin H. Fischer in respect to the benignant effects of sodium chloride in nephritis. His experience and his conclusions antedated Fischer's announcement. In this paper he records his experience and conclusions. Al-

bumin, edema, casts, etc., are conceived as resulting from a kidney acidosis. These may be prevented or eliminated by overcrowding the acidosis by the use of alkalies and neutral salts, of which sodium chloride is one of the most valuable, in spite of the almost universal stand of the recent workers in metabolism that not only is this salt of no use in the treatment of nephritis, but is positively injurious, being productive of further irritation and edema, the condition for which Fischer practically offers it as a cure. Lowenburg gave large doses in his series—180 to 300 grains a day—continuous administration by proctoclysis covering a period of weeks, and the results bore out Fischer's views. Edema passed away, the signs of nephritis disappeared, and diuresis was at once established. The fluid is given at body temperature, at the rate of from twenty to thirty drops per minute. A simple apparatus for the purpose is described. Lowenburg offers the following tentative conclusions:

1. Sodium chloride does not increase water retention in nephritis.
2. Sodium chloride inhibits the action of the toxic agent (acid) producing the nephritis from causing the gelatinous colloid substance of the kidney to absorb water and to go into solution, this being the source of the albumin in nephritis. The amount of the latter is continuously decreased and finally disappears as the strength of the chloride is increased.
3. Alkalies assist the action of the neutral salts.
4. All the other symptoms of acute nephritis, the edema, the urinary findings and the subjective features can be made to disappear or are prevented by a combination of alkalies and sodium chloride.
5. An acute nephritis is benefited by the administration of large amounts of water.
6. A convenient way of administering sodium chloride is by proctoclysis, or in emergency it may be given by hypodermoclysis or by intravenous injection.
7. An advantage of proctoclysis not to be despised is the large amount of water absorbed and which during elimination helps to reduce the kidney's acidosis.
8. Edema is no contraindication to the use of sodium chloride in nephritis. If used sufficiently early it would appear to prevent its occurrence and if present assists in causing its disappearance.
9. In the treatment of the acute infectious diseases and toxemic states, and before and after ether anesthesia, it is recommended to place the patient upon continuous or intermittent proctoclysis with normal saline solution as the urgency of the case may require, together with the administration of alkalies with the desire to prevent the occurrence of nephritis.
10. Lastly, it would appear that Fischer's theory of the nature and cause of nephritis and edema, and the harmlessness, as well as the usefulness, of sodium chloride, finds verification in the protocols of Lowenburg's cases.—*The Pennsylvania Med. Jour.*, December, 1912. 1912.)

Cardio-Vascular Diseases. By Thomas E. Satterthwaite, M. D., LL.D., of New York. Cloth, 166 pages. Illustrated. Published in 1913 by Lemcke & Buechner, 32 West 27th Street, New York.

Obstetric and Gynecologic Nursing. By Edward P. Davis, A. M., M. D., Professor of Obstetrics in the Jefferson Medical College, Philadelphia. 12mo volume of 480 pages, fully illustrated. Fourth edition, thoroughly revised. Buckram, $1.75 net. Published in 1913 by W. B. Saunders Company, Philadelphia and London.

The Physician's Library

Pathfinders in Medicine. By Victor Robinson. New York; Medical Review of Reviews Co., 1912.

It is proper for the well-read physician of to-day, saturated as he is with the medical lore of the age, to put aside modern things for the nonce and turn his thoughts backward toward the dark ages of his profession. When he studies the lives of those old time physicians who knew not microscope or stethoscope and to whom the medical appurtenances of this generation were quite undreamed of, he is more and more impressed with the real greatness of medicine, and there awakens in his mind a determination to do his share toward making medicine an ideal profession.

This admirable book, written by a poet who transfers his thoughts to print in prose, is a wonderful stimulant to a desire for ideality. It portrays in admirable manner many old physicians who are unknown to the vast majority of medical men. The lives, even the very names of Aretaeus, Paracelsus, Semmelweis, Servitus and Vesalius, are closed books to most of the practitioners of to-day, yet they were once living entities, who sacrificed much and gave much that mankind might be richer through their gifts.

These men, and others, have become persons of real, living interest, as the result of these readable and historically valuable essays. Mr. Robinson is the victim of youth. His work is virile with enthusiasm. His sentences are rounded with elegance. His paragraphs are verbal paintings. He is, we say, the victim of youth, and we trust he will ever so remain.

Although not a medical man, he is one of the radiant figures in our medico-literary world. Most of our writers on semi-medical topics are of the deadly dull type. Robinson is a dreamer, a poet and a word painter whose delicate touch proves the saving grace of our literature. His essay on hasheesh is a classic and his story of the men of the forgotten past merely adds to his laurels.

For relaxation, for knowledge and for love of professional ideals, one should wander along the neglected pathways of medicine and gain inspiration from the fifteen epoch-makers of medicine portrayed in this book.

Psychanalysis. By A. A. Brill, Ph. B., M. D., Chief of the Neurological Department of the Bronx Hospital and Dispensary; Clinical Assistant in Psychiatry and Neurology at Columbia University Medical School. Octavo of 337 pages. Cloth, $3.00 net. Philadelphia and London: W. B. Saunders Company, 1912.

This book is an amplification of the Freudian theory by a pupil of Freud. It sets forth a system of treatment of the insane which deals with neuroses as entities, each patient being looked upon as possessing a certain personality which must be considered. The interpretation of dreams and sexual theories play an important role in this method of mind therapy.

This book possesses peculiar interest and it will go far to fix a more important place for the teachings of Freud in this country.

Progressive Medicine. A quarterly digest. Edited by Hobart A. Hare, M. D., Professor of Therapeutics and Materia Medica in the Jefferson Medical College, Assisted by Leighton F. Appleman, M. D., Instructor in Therapeutics, Jefferson College. December 1, 1912. Philadelphia: Lea & Febiger, 1912.

This number is devoted to a series of excellent reviews of the literature of the following subjects: Dis-

(*Continued on p.* 20.)